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BODY TEMPERATURES IN SHOCK.[1]

By R. DOUGLAS WRIGHT

AND

JOHN DEVINE,

Major, Australian Army Medical Corps.

(From the Department of Physiology, University of Melbourne.)

IT was an early observation that people in shock felt cold to the examining hand, and a cold skin became recognized as one of the criteria of shock. In 1776 John Hunter[1] suggested the use of a tepid bath to warm people in shock, and Trueta[2] states that one of the most constant phenomena of shock is low temperature and the facility with which heat is lost from the periphery. Blalock and Price[3] state that cold extremities in shock are due to vasoconstriction, which is not so pronounced in vital structures. By injecting sodium iodide and taking X-ray films, Trueta[4] found this vasoconstriction even in the large arteries of rabbits suffering from shock. Homans[5] refers to the constriction of the arteries noticed following trauma in the war of 1914-1918 as "arterial stupor". Freeman, Shaw and Snyder[6] showed that in surgical shock the volume of blood flowing through the hand was much reduced. In some cases the volume fell from eight cubic centimetres to 1·3 cubic centimetres per 100 cubic centimetres of hand per minute. There are several statements in the literature to the effect that shock is accompanied by peripheral vasodilatation; the colour of the skin and its shrunken appearance suggest that vasodilatation in traumatic shock is not pronounced in the vessels of the human skin. The most reasonable interpretation of the appearance of the skin in cases of shock is that a constriction of its blood vessels is present. The available data do not allow one to draw a firm conclusion that this vasoconstriction is due to a nervous mechanism; but such appears to be its most likely basis. It appears that the peripheral vasoconstriction is in the first place a reaction to pain, and with the advance of the condition of shock a reaction to the reduced circulating blood volume and low arterial blood pressure.

Cooling of the skin leads to diminished blood flow, and this has been shown to be due partly to reflex action and partly to direct action of cold upon the vessels of the skin. The reflex effect may extend beyond the part cooled to the opposite side of the body, and this is known as the consensual reflex (Thauer[7]). It is thus possible that the condition existing in the skin of patients suffering from shock arises firstly from reflex vasoconstriction due to the initial injury, and that it is maintained by the continuing coldness of this part of the body. When the circulatory system becomes embarrassed by reduction of blood volume, the skin vessels are constricted, and so the state of coldness persists.

It becomes therefore of some importance to consider the effect of elevation of the surrounding temperature on a patient in this condition. Prinzmetal and Wilson[8] state that the flow of blood in an arm increases from 1·7 cubic centimetres per 100 cubic centimetres per minute at an environmental temperature of 75° F. to 14·9 cubic centimetres per 100 cubic centimetres per minute at an environmental temperature of 113° F. Burton[9] found an increase from 1·0 cubic centimetre to 90 cubic centimetres per 100 cubic centimetres of finger per minute. Byfield, Telser and Keeton[10] found that a high environmental air temperature increased the blood flow in the skin by 350 cubic centimetres per square metre of skin surface per minute—that is, by 610 cubic centimetres for the 1·73 square metres of skin surface of the average person. This change is commonly associated with sweating and has been analysed in terms of heat conductance (Burton[11]), and it is obvious that a low skin temperature may be associated with a normal rectal temperature. If the low skin temperature is due to a compensation for reduced blood volume, any increased cutaneous blood flow required to maintain a normal body temperature will, of course, reduce the blood volume available for circulation through the deeper structures.

There have been indications that routine warming of patients suffering from shock may not perhaps be consistently beneficial. Observations on such patients who

[1] Accepted for publication, September 2, 1943.

had been immersed in sea water suggested that low temperature might even be beneficial,[12] and the effect of local cold on traumatized parts has previously been discussed by one of us[13] in a paper in which it was shown that local cooling reduced the amount of fluid escaping from the blood vessels. Blalock and Mason[14] found that general elevation of temperature decreased the survival time of dogs which had been traumatized and bled, and that cold lengthened the survival time of these animals, though it did not increase the percentage of survivals. Wakim and Gatch[15] found that both heat and cold decreased the survival time of dogs, rabbits and guinea-pigs suffering from shock and under barbital anæsthesia; the optimum temperature was that which allowed a steady temperature in the animals with minimum of changes for heat regulation. Elman, Cox, Lisher and Mueller[16] found a similar effect in experimental burns in rabbits; they record 75° F. as the optimum temperature.

It was evident, therefore, that the indiscriminate application of heat to patients suffering from shock might not be the best routine procedure to follow. Seventeen patients suffering from traumatic shock were investigated with this in view, and two patients suffering from shock due to other causes were also examined.

Observations.

Twelve of the patients observed were being treated at a military hospital, and seven at civilian hospitals. These hospitals were situated in the south of Australia, and the observations extended from midsummer through autumn to midwinter.

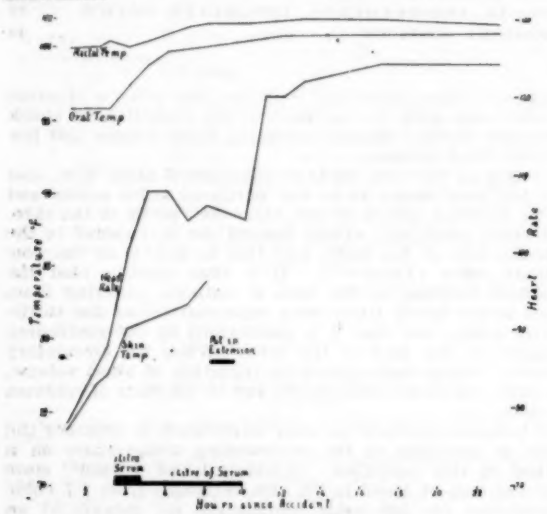

FIGURE I.
Skin temperature, heart rate, oral temperature and rectal temperature in Case II.

Patients who were admitted to hospital suffering from burns, or who had head injuries, or who were intoxicated, were excluded from the series, in order that only the effects of traumatic shock might be studied, and that the results might not be complicated by the loss of temperature control due to head injuries or the peripheral vasodilatation due to alcohol. Patients suffering from shock as a result of operations involving anæsthesia were also excluded for the same reason (see Figure III).

Patients on admission to hospital had their rectal and oral temperatures recorded by means of clinical thermometers. In addition, some had their skin temperatures recorded by means of a thermocouple five inches from the wrist on the palmar surface of the forearm. This arbitrary position was chosen in order to employ a constant position where the skin would be covered by the sleeve. Pulse rate and blood pressure were recorded, and in some cases hæmatocrit readings were taken, hæmoglobin values were estimated and red cell counts were made. The violence causing the shock and the resultant injuries were noted, and the general appearance of the patient was indicated. All times stated refer to the approximate number of hours after the initiating factor or accident.

Criteria of shock caused much trouble. Pulse rate and blood pressure give no idea of the state of shock of the patient, for even a slow pulse rate is common in severe shock, and a rise in blood pressure has been reported in early cases of shock (Trueta[2]). The trend of blood pressure is considered by many to be important, but only in very severe shock. In two cases of severe shock we found

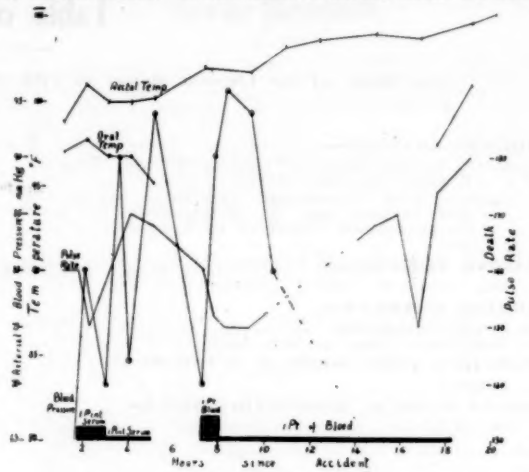

FIGURE II.
Blood pressure, pulse rate, oral temperature and rectal temperature in Case II.

the hæmatocrit reading to fall more than would be accounted for by blood transfusions. Harkins and Roome[17] in six cases report a fall in hæmoglobin value and in the number of red cell counts following shock, and state that it is due to concealed hæmorrhage. Mahoney and Howland[18] also stress the inadequacy of single recordings of hæmatocrit reading and plasma protein level, and state that these often fall rather than rise in the early stages of shock.

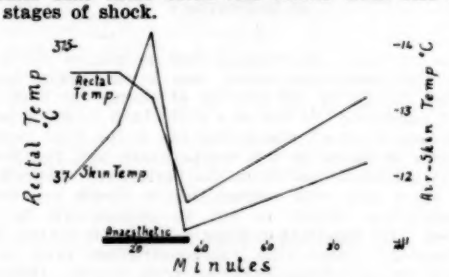

FIGURE III.
Rectal and skin temperatures of a patient under ether anæsthesia.

We found that the most accurate criterion of shock was the general clinical appearance of the patient, together with the occurrence of adequately severe trauma and the presence of injuries caused thereby. Patients suffering from shock were pale and often slightly cyanosed, and wore a "shocked" expression. All were bright and intelligent and fully conscious. They often felt clammy, but no colder than patients coming in from similar environments who were not suffering from shock; this fact was confirmed by thermocouple temperature measurements. Secondary importance was attached to pulse rate and blood pressure and to laboratory findings.

In many cases, treatment, the rush of other casualties and various other reasons prevented the making of extensive and continued observations, and made the records incomplete without appreciably lessening their value.

TABLE I.

Patient's Number and Name.	Time from Accident. (Hours.)	Rectal Temperature. (Degrees Fahrenheit.)	Oral Temperature. (Degrees Fahrenheit.)	Skin Temperature. (Degrees Fahrenheit.)	Pulse Rate per Minute.	Type of Pulse.	Other Observations.[1]	Treatment.	Type of Accident and Injuries.
1. Corporal P., W.A.A.A.F. (Figure I.)	1	99·8	95·8	73·4	78			Blankets placed over her.	Motor car accident. Fractured left femur, right clavicle, left humerus, some fractured ribs. Soaked in petrol, moaning slightly, very pale, trace of cyanosis, very cold to examining hand, but not clammy. Soon after admission to hospital she vomited.
	2½	100·0		77·0		Not palpable in arms.			
	3	100·4	95·8	77·9	88	Not palpable in arms.		Felt warm again, had ceased shivering.	
	4	100·0	97·4	80·6	100	Pulse palpable, full and strong.	Hb. 80% Hct. 41%	Looks far better colour. Felt so hot she wanted blanket removed.	
	5	100·4	98·8		108	Pulse full.			
	6	101·0	99·6		108				
	7	101·4		82·4	104			Has had 1·5 litres serum.	
	8	101·6		84·2	106	Pulse full.	Hb. 69% Hct. 29%		
	9								
	8.15–9.30							Put in extension, arms fixed, and undressed *et cetera*.	
	10	101·6			104	Pulse faint.		Felt much better in herself.	
	11	100·8			120				
	12	100·8			120				
	13	102·0			122				
	17	102·0			124				
	23	101·6	101·0		124				
	25	101·6	100·6		128				
	27	101·5	100·4		120		Hb. 54% Hct. 34%		
	29	101·6	100·2		140				
	32	101·4	100·6		136				
	35	101·8	101·0		120				
	39	102·0	101·4		116				
	43	101·0	100·4		120				
	45	101·6	100·4		136				
	47	101·0	99·6		136				
	49	100·8	99·8		152		B.P. 94	Cyanosed — moaning slightly.	
	52	100·6	100·2	93·0	140				
	53½			88·0			Hb. 54% Hct. 25%	Oxygen, 4 litres per minut Blood transfusion begun.	
	54½	101·0	100·2		136				
	71	100·6	97·6	79·0	140				
	73	101·0	99·6		136				
	75	101·2	99·0		136				
	77	101·4	99·6		136				
	79	100·4	100·0		140				
	81	100·4	98·6		136				
	83	100·0	98·0		140				
	88	100·2	98·4		138			Blood transfusion stopped.	
	92	100·4	98·8		140				
	94	101·0	100·0		140				
	96	101·0	99·6		126				
2. Private T. (Figure II.)	1	98·8	97·0	84·0	160		Hb. 99% R.B.C.'s $4·6 \times 10^6$ Hct. 45% B.P. 64		Riding motor cycle, which was struck by motor car. Left leg almost severed (two compound fractures of left tibia and fibula at different levels, fracture of middle of left femur), fractured jaw, lacerations of the face, ruptured urethra. Pale, slightly cyanosed; exhibited the grey and deathly appearance of extreme shock.
	1½			84·0	160		B.P. 50	Serum transfusion started. Hot water bottles applied.	
	2	100·1	97·8		160+	Just palpable.			
	2½				150		76		
	3	100·0	96·8	89·0	136		70	Second flask of serum commenced.	
	4	100·0	96·8	89·0	170		84		
	5	100·2	95·2	89·0	168		94	Two pints of serum finished.	
				Operation under Gas Anæsthesia.					
	7½	102·0		89·0	160		70/50	Transfusion of one pint of blood commenced.	
	7¾							Transfusion of second pint of blood commenced.	
	9½	101·8		93·0	150		94		
	10¼	103·2		91·0	158?		80		
	14¼	104·0		89·0	168				
	16¼	103·8		89·0	150	Volume very poor.			
	17¼		97·4		174		? 76		
	18¼							Second flask of blood finished.	
	19	104·6	101·0	83·0	180				
	19¾							"Anacardone", one ampoule, given.	
	20	105·2		83·0	Uncountable.				
	20							Patient died.	

[1] Hb. = hæmoglobin value; Hct. = hæmatocrit reading; B.P. = blood pressure in millimetres of mercury; R.B.C.'s = red blood corpuscles.

TABLE I.—*Continued.*

Patient's Number and Name.	Time from Accident. (Hours.)	Rectal Temperature. (Degrees Fahrenheit.)	Oral Temperature. (Degrees Fahrenheit.)	Skin Temperature. (Degrees Fahrenheit.)	Pulse Rate per Minute.	Type of Pulse.	Other Observations.[1]	Treatment.	Type of Accident and Injuries.
3. Private P.	½	99·4	97·8	89·6	96		120		While riding bicycle ran into motor car. Extensive lacerations of thigh, face and hands. Cold and clammy; shivering violently.
	1½	99·0			90		128		
	2½	101·0			112		130		
	3½	101·2			116		110		
	5½	101·6			120		120		
	7½	101·0			116		120		
	15½	99·8			96				
4. Private J.	2	101·0			92		120 Hb. 125%	Heat withheld because of level of rectal temperature.	While riding motor cycle was hit by motor truck. Compound fracture of tibia and fibula. Pale and drawn; skin felt cold and clammy.
	2½	101·0			88		B.P. 112		
	3½	101·0			76		122		
	4				92		120		
	4½				88		116		
	5	100·6			92		120		
	5½				84		134		
	6				88		130		
	6½				88		130		
	7	99·6			84		126		
	7½				88		132		
	8				86		130		
	8½				80		132		
	9				88		134		
	11	99·6			76		126		
	15	99·0			76		126		
5. Driver W.	2	100·0	98·4		84		100		Passenger in overturned truck. Hæmaturia, rupture of left kidney; cold and clammy, looked very shocked.
	3	99·6	98·0		114				
	4	100·2	98·0		100				
	4½	*Operation*							
6. Bombardier B.	2	97·6	95·0	75·0	104		105/70		Motor truck accident. Fractured pelvis and ruptured urethra; abrasions to face and arms. Unconscious for a very short time. After accident was left lying for over an hour on bitumen road among hills covered with snow in early winter morning.
	3½	97·8	96·4	82·4	100·		85 Hct. 42%		
	4	97·6			108		B.P. 80		
	6	99·0	98·6		104		80		
	6½			86·0					
	7½						Hb. 82%		
	8½	99·0	98·4	87·0	108		B.P. 104		
	9½	99·2	98·6		112		104		
	10½	99·0	98·8		118		100	Blood transfusion commenced.	
	11½	99·4	100·0		110		105		
	12½	99·8	101·0		112		100		
	13½	100·6	101·2		110		105		
	14½	102·4	101·4		114		105		
	15½			92·0					
	16½	102·0	101·0		110		110		
	18½	102·0	100·6		114		110		
	20½	100·4	100·0		108		120		
	22½	99·6	98·0		104		140		
	24½	99·6	99·0		100		140		
6A	2	97·8	98·0	64·0	82		140		Same accident as Case 6 and under same conditions. Dislocated shoulder and lacerated hand, but not suffering from shock.
	3	97·6	98·2	86·0	80		Hct. 47%		
	4½	97·8	98·0		82		B.P. 140		
	5½	99·6	99·4		90		145		
	6½			86·0					
7. G.B. ..	1	98·0	96·0		100				Fell from a height. Abrasions, suffering from shock; cold, clammy and pallid.
	1½	98·6	95·0		104				
	2	99·0	95·0		106				
	2½	99·6	96·6		112				
	3	100·0	99·0		102				
8. W.C. ..	1	98·8	97·2		100				Fell from a height into water. Cold, clammy, shivering and pallid. Suffering severely from shock.
	1½	99·0	97·0		102			Tap water given *per rectum*.	
9. Warrant Officer T.	2½	99·4	97·6		86		118		Struck by motor car. Fractured pelvis.
	3½	99·8	99·0		84				
	4½	101·0	100·0		96		114		
	5½	101·0			90		112		
	8½	101·0	99·8		88		116		
	11½	100·0	99·6		90		110		
	12½	100·0							
	13½	99·8	99·6		86				
10. Private W.	½	98·0	96·4		80		Not measurable.		Had been discharged from Army for hyperpiesia and while awaiting discharge he fell heavily on his chest on a tent peg. Pulseless, pale, cold, clammy and slightly cyanosed. Rigid abdomen, but gradually recovered and no operative procedures were necessary.
	8½	99·4	97·0		88		94		
11. Private S.	2	99·2	99·0		92		125		While riding motor cycle was struck by motor car. Compound fracture of tibia and fibula. Cold, clammy, pale, apathetic.
	2½							Leg plaster applied.	
	4	99·2	98·6		92		112		
	5½	98·7	98·0		80		120	Sleeping.	
	7½		98·0		72		118	Sleeping.	

[1] Hb. = hæmoglobin value; Hct. = hæmatocrit reading; B.P. = blood pressure in millimetres of mercury; R.B.C.'s = red blood corpuscles.

TABLE I.—*Continued.*

Patient's Number and Name.	Time from Accident. (Hours.)	Rectal Temperature. (Degrees Fahrenheit.)	Oral Temperature. (Degrees Fahrenheit.)	Skin Temperature. (Degrees Fahrenheit.)	Pulse Rate per Minute.	Type of Pulse.	Other Observations.[1]	Treatment.	Type of Accident and Injuries.
12. Private K.	1½ 4 5 5½ 6	98·4 98·4 100·4 99·0			110 85 78	Not palpable.	Hb. 105% Hb. 100%	Warmed by hot bottles. Blood transfusion started and operation performed.	Had been hit by two different trains after falling out of one of them. Hæmatoma over the abdomen; at first thought to be a rupture of the bladder, as there was blood in the urine; severed right index finger tendon, lacerations to head. Pulseless, extremities very cold to touch.
13. Private J.	1½ 2½	98·8 98·8	97·6 98·4	72·0 77·0	80 80		B.P. 122 130	Operation.	Compound comminuted fracture of tibia and fibula; limb dangling and flopping about, no splinting having been applied and no morphine given. Grey pallor, sweating slightly, cold and clammy. Shivering violently.
14. Lily C. (aged 61 years).	1½	101·2	97·6		108		60		Knocked down by motor car. Compound fracture of right tibia and fibula, fractured right humerus, fractured skull, lacerated scalp. Patient died.
15. J.K. ..	1½	99·4	Would not register.		160		55	Serum given (2 litres).	Run over by motor bus. Fractured pelvis (urine "clear"). Patient died nine hours after injury.
16. C.C. ..	2 3	98·6 98·8	96·2 97·2		120	Poor volume.	80/60	Heat applied and serum given.	Fell off scaffolding. Multiple fractures, including femur, ribs, and thumb, and lacerated scalp.
17. L.C. ..	9	99·0	Would not register.		112		110/80		Fell 20 feet down a quarry; found approximately nine hours later (mid-winter). Fracture of right humerus; multiple bruises.
18. Private B.	2 after drug. 2½ after drug.	Collapse 99·8	96·8			At first imperceptible.	40	With morphine and rest he recovered, and some weeks later a similar collapse was again precipitated by the same drug.	Suffering from chronic nephritis and was given one cubic centimetre of a proprietary mercurial diuretic. Two hours later he collapsed, felt nauseated, and was carried to bed with epigastric and retrosternal pain and tightness of chest. Suffering severely from shock, pale, slightly cyanotic, cold and clammy, beads of sweat on forehead.
19. A.B. ..	1 1½ 2 2½	99·0 99·2 99·2 99·4	96·8 96·8 97·0 97·4		126 130 130 126				Had a rapid hæmatemesis. Cold and clammy, pale.

[1] Hb. = hæmoglobin value; Hct. = hæmatocrit reading; B.P. = blood pressure in millimetres of mercury; R.B.C.'s = red blood corpuscles.

The rectal and oral temperatures of nine normal people about the hospital were taken to obtain data on the normal difference to be expected between the temperatures taken in these two sites.

There were nineteen patients suffering from shock. On their admission to hospital, their average rectal temperature was 99·3° F. and their average oral temperature was 96·7° F. There were nine normal subjects. Their average rectal temperature was 98·6° F. and their average oral temperature was 97·5° F.

A normal young male resident medical officer, aged twenty-five years, was placed under a radiant heat "shock cradle", one arm being left free for recording of the skin temperature. The room temperature was 64° F. The results of the observations are given in Table II.

Skin Temperatures.

Sheard, Williams and Horton[19] show that the skin temperature of people in a thermally comfortable environment is normally 32° to 35° C. on the upper parts of the legs and arms, and falls as the extremities are approached, where it is often no higher than the environmental temperature, particularly at the toes. The skin temperature of the extremities decreases when the extremity is raised and increases when the extremity is lowered and is also said to be affected by meals. (In the cases recorded below, no change was found in skin temperature after and during meals.)

In four cases recorded below skin temperature readings were taken at the standardized spot five inches from the wrist on the ulnar surface of the forearm. Those readings were made by means of a thermocouple, in centrally heated wards, kept at an average temperature of about 21° C. In addition a record was made of the skin temperature of a patient undergoing a minor plastic operation under ether anæsthesia.

Skin temperatures depend largely on the temperature of the environment and are exceedingly variable. In the series here reported, the lowest skin temperature (18° C. in Case VIA) was that of a man who showed no other evidence of shock. Thus the skin temperature of the patient is no criterion of the state of shock; neither does it give any indication of his internal body temperature. The skin temperatures and oral temperatures seemed to follow each other; when the skin temperature was low the oral temperature was found to be low, and *vice versa*. Thus it would appear that in cases of shock the mouth temperature also gives no real indication of the internal body temperature. This may be due to environmental

TABLE II.[1]

Time. (P.M.)	Weight. (Kilograms.)	Blood Pressure. (Millimetres of Mercury.)	Pulse Rate per Minute.	Temperature. (Degrees Fahrenheit.)					
				Mouth.	Rectum.	Forearm.	Palm.	Finger.	Enclosed Air.
8.20	63·0	110	72	97·8	100·0	88·0	77·0	67·6	64·0
8.20	Elements switched on.								
8.35						85·3	87·8	95·0	108·0
8.50		90	90	99·6	Sweating.	97·7	100·5	100·7	113·0
9.20	62·52	140	120	103·0	102·2	102·0	101·0	101·0	125·0

[1] The subject became very apprehensive, passing into confusion. He said later that his visual fields contracted until he appeared to be looking through binoculars without fusion and was very giddy. About 450 cubic centimetres of water were lost in this hour. The oral and rectal temperature thermometers were checked against each other, and the observations were repeated at 9.24 p.m. to confirm the readings.

TABLE III.
Time and Skin Temperature. (*Degrees Centigrade.*)

Number of Patient.	Time.											
	Noon 12	2	4	6	8	10	Midnight 12	2	4	6	8	10
I	30·0	31·0	33·5	31·0	31·5	29·0	31·0	29·4	31·2	31·0	28·2	29·0
II	29·0	32·0	33·0	32·0	33·0	32·0	31·0	31·0	31·4	28·0	25·2	26·0
III	31·0	30·5	30·8	31·4	30·0	32·0	32·0	29·0	31·0	28·0	29·4	25·4
IV	31·0	29·0	31·0	31·0	31·0	29·0	29·0	30·0	28·0	30·0	28·0	30·8

TABLE IV.
Temperature of a Patient undergoing Ether Anæsthesia. (*Degrees Centigrade.*)

Time.	Rectal Temperature.	Skin Temperature.	Room Temperature.	Difference between Skin and Room Temperatures.	Notes.
3.50 p.m.	37·4	33·8	21·8	12·0	Anæsthesia not yet started.
4.00 p.m.	Anæsthesia commenced (chloroform and ether).				
4.05 p.m.	37·4	34·8	22·0	12·8	Anæsthesia induced.
4.15 p.m.	37·3	37·0	22·8	14·2	Operation.
4.25 p.m.	36·9	33·2	22·0	11·2	Operation.
5.10 p.m.	37·3	35·0	22·8	12·2	Operation over.

influences affecting the mouth, or to vasoconstriction inside the mouth, though no obvious pallor of the oral mucous membranes was present in several patients who exhibited pallor elsewhere. Proctoscopic examination of one patient suffering from shock disclosed no appreciable difference in the colour of the mucosa from that usually observed.

In Case II the radial nerve was injected with a local anæsthetic agent at a level just above the elbow. Anæsthesia at the back of the thumb occurred, with no change in skin temperature in that area. No change was observed in the radial pulse.

Discussion of Cases.

Among the patients suffering from shock, the average rectal temperature on admission to hospital was 99·3° F., and the average mouth temperature was 96·7° F. In Case VI, in which the rectal temperature was 97·6° F., the patient had been subjected to a very low environmental temperature, which had reduced to 97·8° F. the temperature of an ambulatory patient (Case VIA), who had received minor injuries in the same accident and was not suffering from shock. This observation bears out the finding of Winslow *et alii*,[30] who showed that if a normally clothed person stays still in an environment with an operative temperature below 77° F., the general body temperature gradually falls. The patient suffering from shock tends to remain very still, and therefore in a cool environment has a lowered temperature. During a fire disaster in Boston in bleak weather, when burned persons were in wet clothes, some rectal temperatures as low as 94° F. were recorded.[31] (Of course, burn shock has a make-up different in many respects from that of traumatic shock. Much of the present confusion in our knowledge of shock is due to failure to differentiate features peculiar to each of the many individual types of injury leading to shock.)

However, though it cannot be doubted that in a cold environment the body temperature drops in shock, it seems that in the cases here reviewed there is a tendency for a rise in internal temperature in shock, or at least for no fall. This is physiologically reasonable, for a cutaneous vasoconstriction is an early response in shock and results in diminution in heat loss, which may or may not be considered protective. This raised rectal temperature may have some bearing on the pulse rate in cases of shock, for a raised temperature causes an increase in pulse rate. Further, from this series there is to be noted a pronounced increase in the normal interval that exists between the rectal and oral temperatures; the average difference is 2·6° F. in cases of shock and 1·1° F. in controls. The oral temperature seems to be fairly uniformly lowered in cases of shock, and may be considered a useful criterion of shock. A point of some interest occurred in Case XVII, in which, despite the fact that the patient had been exposed to low temperature for nine hours after injury, the rectal temperature was 99° F. An hour after he had been put to bed with hot tins, the rectal temperature had fallen to 97·2° F., presumably because the circulation into the cold parts of the body was opened up by the applied heat. Uncontrolled application of heat in cases of shock raises the question of the hyperpyrexial shock which Kopp and Solomon[29] induced, by raising to 106° F. the rectal temperature of psychiatric patients, by putting them in a warm, dry atmosphere.

Conclusions.

A drop in internal temperature is not usual in cases of shock, but if the patient is subjected to a low environmental temperature, the internal temperature drops as readily as that of normal subjects in similar circumstances. The mouth temperature is, however, frequently lower than in normal patients.

In some cases, in which no heat was applied after admission to hospital and in which the patients were merely covered with blankets, the rectal temperature rose well above normal limits.

Practical considerations arising from these observations are the following.

1. Heat should not be applied to patients suffering from shock until the rectal temperature has been taken.
2. Repeated observation of the rectal temperature following admission to hospital will prevent deleterious overheating of the patient.
3. Heat should not be applied to a patient unless facilities are at hand to supplement the loss of circulating blood that occurs as a result of change from peripheral vasoconstriction to vasodilatation.
4. "Shock cradles" need close supervision and probably should not raise the air temperature above 90° F.

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CALCIUM AND PHOSPHORUS ABSORPTION IN BREAST FED INFANTS AND ITS RELATIONSHIP TO BONE DECALCIFICATION (RICKETS).

By NORMAN L. WAKE, B.Sc.,[1]
with the technical assistance of MARGUERITE GIBSON.[1]
Sydney.

IN a review of the literature on calcium absorption, Leitch[1] showed that the amount of calcium and phosphorus absorbed by breast fed and artificially fed infants varied considerably. The mean calcium absorption recorded from 21 observations on breast fed infants, quoted by Leitch, was 36%, whilst the range was from 4% to 68%.

Calcium and phosphorus are the two main constituents of bone, and satisfactory bone growth can occur only when adequate quantities of both are available within the body. Incomplete calcification of the growing ends of the long bones of infants occurs in rickets, and it is generally associated with inadequate supplies of available calcium within the body.

Clinical rickets is the end point of a process which commences with slightly imperfect calcification of the growing ends of the long bones of infants and children. If it is unchecked, the calcification becomes more and more imperfect until the ultimate appearance of florid rickets. The early stages of the pathological process can be detected in radiographs before any clinical manifestations appear.

In a number of the experiments reported by Leitch in her review, the amount of calcium absorbed was particularly low, whether estimated per kilogram of body weight or as a percentage of the intake. This has been accepted by many as the cause of development of rickets in some infants during the first year of life.

To investigate this relationship, a long-term experiment was planned, in which the calcium and phosphorus metabolism of a number of breast fed infants was studied. Throughout the experimental period regular radiographs were taken of the bones of both wrists of all infants. The radiographs were reported upon separately by Dr. E. W. Frecker, of Sydney, and Dr. F. W. Clements, of Canberra. The standard for the interpretation was identical with that used by Clements.[2]

About 50% of the infants showed some departure from normal calcification. In most of these cases clinical rickets did not develop, the pathological changes being confined to imperfect calcification of the metaphyses of the lower ends of the ulna and radius.[1]

With the exception of recent work by Liu[10] and his co-workers, we have found no records of similar experiments with breast fed infants, in which mineral metabolism experiments were checked with regular radiographs of growing bones.

The amount of calcium available in the body is dependent upon a number of factors, including the amount of calcium ingested and the concentration of vitamin *D* in the body. Genevieve Stearns[3] has remarked that infants who have been given vitamin *D* and human milk show much less variability of retention and greater average retention of calcium than infants not given vitamin *D*. Reed and his co-workers[4] crystallized existing knowledge when they wrote that vitamin *D* "facilitates absorption of calcium and phosphorus from the intestinal tract". This action of vitamin *D* is particularly noticeable when the calcium intake is low or when the calcium-phosphate ratio is unsatisfactory.[5]

In the metabolism experiments described in this paper, all infants were given a liberal exposure to sunlight, and in addition a limited number of other infants were given a medicinal preparation containing vitamin *D* in concentrated form.

THE TECHNIQUES USED IN THESE INVESTIGATIONS.

The Collection of Samples.

The principles of the technique of mineral balance experiments are constant—namely, that the retention is found by analysing aliquot parts of the food and of the excreta corresponding to the feeding period; the difference between these two values gives the mineral retention of the infant for the period studied.

In this series a portion of the breast milk was collected from each feeding each day and pooled and analysed. This supplied the intake of calcium and phosphorus.

For the collection of excreta the infant was placed on a metabolism frame of our own design, the details of which were worked out by Miss Gibson. The essential feature of the frame was a round rubber air-cushion with a hole in the centre. The infant's buttocks fitted into this hole, and the excreta passed through to be collected in a container beneath. The urine was collected separately from all patients, except when urination coincided with defæcation. Carmine was used as the fæcal marker; it was given in the first feed (6 a.m.) of the period to mark the beginning, and the first stool to show carmine was collected. Charcoal, given in the first feed after the conclusion of the period (6 a.m. on the fourth day) was used to mark the end. The first stool to show charcoal was discarded.

[1] This work was financed by a grant from the National Health and Medical Research Council and carried out under the direction of its Nutrition Committee.

[1] One school of investigators in America and another in Sweden regard even minor degrees of imperfect bone calcification as rickets.

Analysis of Breast Milk for Calcium and Phosphorus.

The analytical technique was similar to that used by Stearns (personal communication). Triplicates, each of about 30 or 40 grammes, were taken from composite samples of the three-day period, evaporated to dryness and dry-ashed in a muffle furnace, and the ash was dissolved in 40 millilitres of N/2 hydrochloric acid, the solution being heated at 100° C. for several hours to reconvert pyrophosphates to orthophosphates. After the ash-solution had been diluted to 100 millilitres, 75 millilitres were used for calcium estimation, and portion of the remainder (usually from two to eight millilitres) was used for phosphorus estimation.

Preparation of Excreta for Analysis.

The excreta were collected in enamel vessels, and the three days' collection was transferred quantitatively to a three-litre Erlenmeyer flask; 100 millilitres of concentrated hydrochloric acid were added, and the flask was boiled for about two or three hours so as to obtain a homogeneous suspension suitable for pipetting. After the suspension had been made up to one litre, either 25 millilitres (in the case of older children) or 50 millilitres (in the case of infants aged about three months or less) were evaporated to dryness and dry-ashed in a similar way to the milk.

Calcium Analysis.

The method of calcium analysis used was McCradden's technique as modified by Stearns.[6]

Phosphorus Analysis.

A modification of Briggs's colorimetric method was used for the phosphorus analysis.[7]

Source of the Material.

The infants were inmates of Saint Anthony's Home, Croydon, New South Wales. We found that most of the mothers were cooperative and most anxious to feed their children.

The birth weights of the infants were within the normal range of full term infants. During the past three years 214 sessions, each of three days, have been conducted in the investigation of fully breast fed infants.

In this paper results obtained from a study of 22 breast fed infants, upon whom regular sessions of examination have been conducted for at least three months, will be presented. In many cases an infant left the institution after it had taken part in one, two or three sessions. These cases are not included in the results here presented.

The Influence of Vitamin D.

As has been emphasized earlier, vitamin *D* plays an important rôle in the absorption of calcium from the alimentary tract. We divided our experiments into two sections. In the first part, the infants were exposed to sunlight for varying periods each day, but in no instance did the infant receive less than thirty minutes of direct sunlight to half the body. After the infant had become accustomed to the sun the length of the exposure was frequently increased to an hour or more. We felt that this quantity of sunlight was much more than the average infant of tender months receives in its own home.

In the second half of the work six infants were given a halibut oil preparation by mouth, whilst the mothers of five others received large doses (2,000 to 3,000 international units of vitamin *D* per day) as a halibut oil preparation in capsules. These eleven infants were given regular sunbaths, so that they received vitamin *D* from two sources.

The Results of this Investigation.

The Sessions.

Each metabolism session was of three days' duration. Generally two and sometimes three sessions were conducted during each month of the child's age. Although the period over which the milk intake was recorded lasted for three days, the collection of excreta corresponding to this intake lasted longer. Thus, each session occupied nearly a week. The infant was generally given a week's rest and then took part in another session. In a number of instances an infant took part in three sessions during three consecutive weeks.

For the purpose of analysis of the records, it was important to know whether a preceding session influenced the mineral metabolism of later sessions, when the proximity of the two sessions varied from the next week to an interval of one, two or three or more weeks.

Statistical treatment of the results of calcium and phosphorus retention tests revealed that there was no relationship between the retention during a session and that during subsequent sessions. In consequence, the separate observations made on any child may be considered as independent. In these circumstances, the results of all sessions were treated as if each was a separate observation.

The Classification of the Subjects.

The infants were divided into two main groups: (i) those whose source of vitamin *D* was exposure to the sun; the mothers of these infants were not given a halibut oil preparation; (ii) those to whom additional vitamin *D* was given, or to whose mothers medicinal vitamin *D* was administered.

The reports concerning the calcium and phosphorus metabolism tests will be confined to those relating to the infants in the first group. Reference will be made later to the results obtained in experiments with the infants in the second group.

The regular radiographs taken of the long bones enable the infants to be further divided into two groups according to the bone calcification: (i) group A: those who showed no evidence of defective bone calcification during the period of investigation or in the month following; (ii) group B: those who showed defective bone calcification varying from a mild form to frank rickets.

The body weights of the infants in these two groups were examined statistically without the discovery of any difference in the average weight for age of the two groups.

The Calcium and Phosphorus Retention of Breast Fed Infants.

As indicated earlier, it was demonstrated statistically that each session on each child could be considered as a separate observation. Sixty sessions were conducted on twelve infants whose bone growth was found by radiographs to be normal, whilst fifty-five sessions were carried out on ten infants who showed defective bone calcification. The mean absorption of calcium and phosphorus for the two groups of infants is shown in Table I.

The difference between the mean absorption of calcium and that of phosphorus, whether expressed as the absolute retention per kilogram of body weight or as a percentage of the intake, was not statistically significant for the infants in either group.

A number of workers, including Stearns, have demonstrated that the calcium retention of rhachitic infants varied much more widely than that of normal infants. The figures for the calcium and phosphorus retention obtained in this investigation were submitted to statistical treatment to investigate this feature. It was found that the degree of variation in the calcium and phosphorus absorption of the infant who showed defective bone calcification was not greater than in that of the normal infant.

The following two findings are important: (i) that no difference was observed in the amount of calcium or phosphorus, or both, retained by infants who developed signs of defective bone calcification and in that of normal infants; (ii) that the degree of variation in the calcium and phosphorus retention was not significantly different in the two groups. These findings are contrary to statements commonly made, and will be fully discussed later.

Calcium and Phosphorus Retention per Month of Age.

Since it has been shown that each session may be considered individually and that there is no significant difference between the calcium and phosphorus retention of normal infants and that of those with defective bone metabolism, the findings in the two groups can be combined to determine the calcium and phosphorus retention in relation to age. The results of this combination are shown in Table II. It will be seen that the mean calcium retention shows a small range of variation up to the age of sixteen weeks. The maximum difference during this period is not statistically significant. Thus the calcium retention during the first four months is about 20 milligrammes per kilogram of body weight, or between 45% and 50% of the calcium intake. Similarly, the mean phosphorus intake is constant around 12 milligrammes per kilogram of body weight, or between 56% and 66% of the phosphorus intake.

TABLE I.

Mean Calcium and Phosphorus Absorption.

Classification of Infants According to Bone Development.	Number of Observations.	Calcium.		Phosphorus.	
		Retention per Kilogram of Body Weight. (Milligrammes.)	Percentage Retention of Intake.	Retention per Kilogram of Body Weight. (Milligrammes.)	Percentage Retention of Intake.
Normal	66	18·84±1·45	46·97±3·90	11·20±0·74	57·91±3·28
Defective bone calcification	55	19·66±1·59	46·27±4·28	12·86±0·81	60·56±3·59

TABLE II.

Calcium and Phosphorus Absorption per Month of Age.

Month of Age and Number of Observations.	Calcium.						Phosphorus.					
	Retention per Kilogram of Body Weight.			Percentage Retention of Intake.			Retention per Kilogram of Body Weight.			Percentage Retention of Intake.		
	Mean. (Milligrammes.)	Standard Deviation.	Range. (Milligrammes.)	Mean. (Percentage.)	Standard Deviation.	Range. (Percentage.)	Mean. (Milligrammes.)	Standard Deviation.	Range. (Milligrammes.)	Mean. (Percentage.)	Standard Deviation.	Range. (Percentage.)
1st. 10 ..	18·8	7·3	4–18	45·0	17·6	10–80	11·9	5·9	4–22	56·0	18·7	19–81
2nd. 36 ..	19·7	6·5	7–32	43·0	13·4	17–69	14·9	4·2	4–21	55·8	15·8	34–86
3rd. 35 ..	20·2	6·9	5–36	47·3	19·4	11–81	11·9	3·5	5–22	62·1	14·1	35–86
4th. 18 ..	20·0	4·9	11–31	52·4	14·2	14–78	12·1	2·9	7–15	66·2	11·0	36–79
5th. 11 ..	14·7	6·3	5–26	41·6	14·2	11–68	9·8	2·5	5–13	55·0	16·2	31–74
6th. 3 ..	16·6	—	11–24	49·0	—	32–77	9·0	—	7–11	53·0	—	43–69

Although the values for the mean retention per kilogram are reasonably constant during this period, a wide range in the amount of calcium and phosphorus absorbed was recorded between cases.

Statistical treatment of the results suggested that the retention of calcium and phosphorus followed a pattern which was peculiar to each infant. That is to say, some infants throughout the series recorded regularly high retention, others regularly low retention, whilst that of others was noticeably irregular.

An Investigation of the Possible Causes of Variation in Calcium Retention.

It has been shown[2] that the concentration of vitamin *D* in the body affects the absorption of calcium. An infant can obtain vitamin *D* by synthesis from exposure to the sun, from that present in the maternal milk, and in a medicinal product given to the child.

The Effects of the Season of the Year on Calcium Retention.

The nurse in charge of the infants during the sessions endeavoured to give them the optimal amount of exposure to the sun commensurate with the season of the year. For example: in summer the infants received up to sixty minutes' exposure a day, between 9 a.m. and 10 a.m., whilst in the winter time they received about the same exposure around midday. Almost the whole of one side of the body was exposed.

Analysis of the results demonstrated that the season of the year did not influence the calcium absorption. The mean calcium absorption for the infants investigated did not vary significantly with the month of the year during which the observation was made. The policy of providing maximum exposure to the sun undoubtedly ensured a maximum synthesis of vitamin *D* at all times.

The Vitamin D Content of Human Milk.

Throughout this work we have not considered the effect of the vitamin *D* present in human milk other than when a halibut oil preparation was given to the mother. Drummond and his co-workers[8] have shown that the amount varies considerably, and that the mean of 26 samples was six international units per 100 millilitres. That means that an infant, aged three months, would receive about 60 international units from its mother. This is considerably below the quantity of medicinal vitamin *D* considered optimal by workers in rickets (Jeans[9]). No attempt was made by Drummond and his co-workers to control the vitamin *D* in the human milk in the cases in that series.

Liu and his fellow workers[10] have shown that a high percentage retention of calcium by the infant can be obtained by the administration to the mother of large doses of vitamin *D*, suggesting that some of this vitamin is conveyed in the milk.

The effect of exposure to the sun on the mother and on the vitamin content of her milk has not been considered by us. As many of the mothers were engaged in household duties throughout the day, it is doubtful whether they received more than a minimal exposure to the sun.

The Administration to the Infant of a Vitamin D Concentrate by Mouth.

In order to compare the effect on calcium retention of the administration of medicinal vitamin *D* by mouth, six infants were selected at random. A number of sessions were conducted on five of them, and then a halibut oil preparation was administered in doses of about 400 international units per day. In one other case the administration of a halibut oil preparation and exposure to the sun were commenced simultaneously when the child was aged about two weeks.

The response to the additional vitamin *D* given varied, as will be seen from Table III.

TABLE III.

Effect on Calcium Retention of Administration of Additional Vitamin D to the Infant.

Child.	Mean Calcium Retention Percentage of Intake.	
	Before Administration of Additional Vitamin *D*.	After Administration of Additional Vitamin *D*.
Helen	28	41
Lawrence	71	70
Marie	31	34
Rae	56	27
Wendy	63	70

The responses to additional vitamin *D* were not constant, and the results suggest that the children had obtained the maximum requirements of vitamin *D* from exposure to the sun, and that the administration of additional vitamin *D* by mouth did not improve the calcium retention.

The Administration of Medicinal Vitamin D to the Mother.

The administration of a halibut oil preparation to the mothers of four infants was commenced after a number of preliminary sessions had been conducted on the infants. The dose administered was about 3,000 international units per day. One mother received the halibut oil concentration when her infant was two weeks of age and before a preliminary session had been conducted.

The response to the additional vitamin *D* varied, as will be seen from Table IV.

TABLE IV.

Effect on the Calcium Retention of the Infant of the Administration of Additional Vitamin D to the Mother.

Child.	Mean Calcium Retention Percentage of Intake.	
	Before Administration of Vitamin *D*.	After Administration of Vitamin *D*.
Joseph	23	44
Robert	59	65
Susan	62	60
Robyn	39	33

The Effect of Calcium and Phosphorus Ratio in Human Milk on the Calcium Retention.

A number of workers, including Sherman and Pappenheimer[11] and Shohl and Wolbach,[12] have emphasized the importance of the calcium and phosphorus ratio in the development of rickets in rats. We have investigated the effect of the calcium and phosphorus ratio in human milk upon the percentage absorption of calcium. The results indicate that when the ratio of calcium and phosphorus in the milk lies between 1·6 and 2·2, the calcium retention percentage of intake was higher than when the ratio of calcium and phosphorus was from 2·2 to 2·8 (statistically this was significant at the 5% level).

DISCUSSION.

In this investigation the infants were kept under radiographic surveillance, not only whilst they were the subjects of the metabolism experiments, but for several months after. It was considered that the radiographic observations were continued long enough to record the effects of the calcium and phosphorus absorption at the time of the balance experiments.

About 50% of the infants showed signs of imperfect calcification of the long bones either during the period of the metabolism experiments or within a month of their completion. The mean calcium and phosphorus retention of this group did not differ significantly from the mean retention of the group that showed normal calcium retention. It would appear, then, that the calcium or phosphorus, or both, absorbed during the period of observation (that is, during the first six months of life), did not influence the degree of calcification of the growing bone.

Clements[2] has shown that amongst a group of infants who had defective calcification of the long bones (mild rickets) the onset had occurred, in 80% of the cases, before the sixteenth week of post-natal life. The author has suggested that the amount of calcium stored in the long bones during intrauterine life has an important influence on post-natal calcium metabolism. He suggests that defective storage due to inadequate calcium absorption by the mother during the later half of the pregnancy is probably the most important factor in determining the degree of calcification of the growing bones of the infant in the first year of life. His work suggests that the effects of defective storage of calcium in the long bones becomes evident radiographically in most cases by the end of the sixteenth week.

The results of the present investigation revealed no significant difference in calcium retention between infants with normal calcium metabolism and those who showed defective calcification of growing bones. Thus, whilst not adding proof to the hypothesis advanced by Clements, these results do lend strong support to it. This interpretation also explains the fact that the degree of variation in calcium and phosphorus retention was not significantly different between the normal infants and those with decalcification of the growing ends of long bones.

CONCLUSION AND SUMMARY.

1. Calcium and phosphorus metabolism experiments, totalling 115 three-day sessions, were carried out on 22 breast fed infants.

2. At the same time radiographs were made regularly of the bones of both wrists.

3. Ten infants showed defective calcification of the long bones, either during the time when they were subjects of the balance experiments or in the month following the cessation of observations.

4. The differences between the mean absorption of calcium and phosphorus between the infants who showed defective calcification and those whose calcification was normal were not statistically significant.

5. These results lend support to the hypothesis advanced by Clements that the amount of calcium stored in the skeleton during pregnancy is the major factor determining the degree of calcification that takes place in the developing bones in the first months of post-natal life.

6. In this investigation the variation of calcium absorption amongst the group with defective calcification was not significantly different from that of the group with normal calcification.

7. From the limited number of observations made, it was no possible to draw any conclusions respecting the effect of administration of medicinal vitamin *D* either to the infant or to its mother on the percentage of calcium absorbed.

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The Medical Journal of Australia

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THE FUTURE OF CANCER TREATMENT IN AUSTRALIA.

DISCUSSIONS that have taken place during the last few weeks in Sydney, in Melbourne and in Brisbane on the centralized treatment of cancer are destined, unless present portents are fallacious, to be recalled in the years to come as marking a turning point in the history of cancer therapy in Australia. The discussions were made possible by the presence in this country of Dr. J. Ralston Paterson, of the Christie Hospital and Holt Radium Institute, Manchester, and of his wife, Dr. Edith Paterson, who is attached to the same institution. A great deal of publicity has been given to their views, and there is no doubt that hospital authorities, medical staffs of hospitals and the profession generally, as well as State ministers who control the public moneys, have been given much matter for serious thought. The successful outcome of the discussions will depend jointly on the governments who have to find the money, and on members of the medical profession and hospital authorities whose cooperation is essential to the success of any scheme of centralized treatment.

The visit to Australia of Dr. Paterson and his wife was brought about in an interesting way. The Government of New South Wales has for some time been gravely concerned about the incidence of cancer in the community and determined to take what steps it could to give to affected persons the best possible chance of cure by the application of modern methods. The Government did what none of its predecessors had done—it approached the New South Wales Branch of the British Medical Association and asked it to nominate members of the profession with special knowledge of cancer and its treatment for appointment to a committee that could advise the Government. The committee appointed on the Branch nomination included the following: Dr. P. D. Braddon, Dr. A. L. Dawson, Dr. B. T. Edye, Dr. R. I. Furber, Dr. H. T. Ham, Professor W. K. Inglis and Dr. A. T. Nisbet. Mr. Cobden Parkes, Government Architect, was appointed a member, and Mr. C. J. Watt, Under Secretary of the Department of Health, was an *ex-officio* member. Some of the members of this committee had first-hand knowledge of the work of Dr. Ralston Paterson and of the value of the Christie Hospital and Holt Radium Institute as a unit to combat the ravages of cancer. This unit, it should be remarked, is the largest and most comprehensive of its kind in Great Britain. The Government of New South Wales, having declared its intention to spend the sum of £250,000 in the establishment of a centre for cancer treatment, and being determined to secure the best possible advice, decided, after consultation with the advisory committee, that Dr. J. Ralston Paterson should be invited to visit Australia in order to advise the Government how it ought to proceed. An invitation was accordingly sent to England. As the Honourable W. J. McKell, Premier of New South Wales, has on more than one occasion stated publicly, the acceptance of such a request in wartime was no light or simple matter. Not only, however, was Dr. Paterson willing to undertake the hazardous journey, but the authorities of the Holt Institute decided with characteristic British generosity to pay the whole of his salary for the period of his absence from England. Once the visit had been arranged and the plan had become known in other States, Dr. Paterson was invited to extend his visit beyond the borders of New South Wales. With the consent of the New South Wales Government this was done and Melbourne and Brisbane were included in Dr. Paterson's itinerary. Representatives from South Australia and Tasmania met Dr. Paterson at Melbourne, and it may be claimed that his views on cancer treatment have been widely disseminated.

What then are Dr. Paterson's views? He expressed them at meetings of hospital administrators, hospital staffs and Branch councillors in Sydney and Melbourne. He holds that if any real progress is to be made in cancer treatment, a completely new outlook is called for and also a new organization. In this organization extensive centralization of all cancer treatment will be needed. Centralization is necessary for three reasons. The first is that in not a single cancer type are the registered cancer deaths dropping to any appreciable extent. In countries or States taken as a whole the number of patients cured are too small a fraction of the total numbers to affect the vital statistics. In selected areas excellent work is being done, and yet great tracts of every country are scarcely touched by modern knowledge in the cancer field. The second reason advanced by Dr. Paterson is that the incidence of cancer is increasing because of the steadily rising average age of the population. Readers will remember that the shift to higher age levels in Australia was discussed in this journal by C. V. Crockett in the issue of December 11, 1943. Dr. Paterson thinks that eventually cancer will become the commonest cause of death. The third reason (Dr. Paterson calls them realities) is one that ought to be "the antidote to the other two"—that at the present time enough is known, if available knowledge is thoroughly and promptly applied, to alter the state of

affairs very greatly in a number of types of cancer. The most curable cancers are the accessible growths, those of the breast, mouth, skin, uterus and rectum. These are not being cured in sufficient numbers, and Dr. Paterson believes that by reorganization alone it will be possible to increase greatly the chance of survival of patients suffering from the accessible types of cancer. In the present method of decentralized treatment cancer is treated, like other diseases, as part of medicine and surgery, and medical practitioners cannot fail to agree with Dr. Paterson that the results have not been adequate. He holds that the necessary reorganization would "concentrate cancer treatment to single units functioning on an extensive scale". If this is to be done effectively, it must, he states, become a State problem. This has been recognized in other places—in England a special act of Parliament, the *Cancer Act*, was passed to deal with the problem of cancer. Some of the United States of America and certain of the Provinces of Canada are making State plans, and, indeed, the New South Wales Government's invitation to Dr. Paterson and his wife was a step in the same direction. The experience of twenty years has shown the wisdom of such planning, and the world famous Radiumhemmet at Stockholm, the *Fondation Curie* at Paris and the Memorial Hospital at New York, as well as the Holt Institute at Manchester, have paved the way for similar organizations. No one will deny that intense specialization does produce technical ability and maturity of judgement that can be acquired in no other way, and cancer is the one type of disease among all others which seems to call for specialization. Some idea of the wealth of opportunity provided at a central cancer institute may be gathered from the fact that in a period of ten years Dr. Paterson has seen and "to a considerable extent" followed up 2,000 patients suffering from cancer of the mouth. Any medical officer taking up the specialty of radiotherapy for the first time at Manchester will see three or four hundred cancers of the mouth in two years of service. Most senior surgeons of a general hospital do not see so many cases in the whole of a surgical lifetime. It is quite easy to understand that one surgeon who has performed in one ward alone over three hundred operations for the removal of malignant glands of the neck will see few recurrences in his patients. Recurrences will not be so rare in the experience of general surgeons, even "of the very highest calibre". So much does success depend on the availability of first-class equipment that a central institute for one large area will appear at once as best suited to meet requirements in this regard.

When once it is granted that a central institute or clinic is desirable, other questions have to be settled. These have been discussed by Dr. Paterson. The first point is in regard to the size of the area that should be served by a cancer institute. Dr. Paterson holds that the units should be of sufficient size to handle enough cases of each of the treatable forms of cancer for the staff to obtain extensive experience both in the matter of diagnosis and also in the technique of treatment. He showed that the area to be served by a special clinic depended on the nature of the condition with which it had to deal. Thus the area covered by a fracture clinic will not be the same as that for a clinic dealing with cancer. He stated that all the studies by the British Radium Commission and other bodies with knowledge showed that the minimum of population required to carry on an effective and adequately equipped cancer unit was a million persons. In these circumstances the Australian problem becomes relatively simple. Sydney, Melbourne and Brisbane could each be made the site of a cancer institute. Tasmania could be served by Melbourne. South Australia and Western Australia are in Dr. Paterson's opinion on the small side and would "function as minor centres". A centre at Adelaide might serve Western Australia as well if efficient diagnostic centres were established in suitable areas. As a matter of fact, diagnostic centres are part of the whole scheme visualized by Dr. Paterson. In this country with its great distances this is of the utmost importance, but we must go further than this, for it should never be forgotten that the success of any organization for cancer treatment will be impossible without wide dissemination of knowledge among the public, particularly in regard to curable and treatable cancer, so that in the early stages of disease they will seek advice from their own doctors who will make full use of diagnostic facilities. Here it is well perhaps to state that Dr. Paterson believes that diagnostic centres scattered throughout the country should receive visits at regular intervals from experts who are on the staff of the central institute. This will be doubly advantageous—it will bring an expert opinion to bear on the patient's problem and it will stimulate the practitioner to be wide awake and discerning in his role of watchman. The expert who would visit diagnostic centres would preferably be a full-time member of the central organization. That the officer in charge of a central cancer institute should, as Dr. Paterson avers, hold a full-time appointment is the logical outcome of the opinions that have been expressed. The whole-time officer would be a radiotherapist. In regard to surgery, Dr. Paterson's view is that a surgeon specializing in cancer should devote, say, half of his time to such duties. It is thought that in this way he would keep in touch with general surgery—and this is desirable.

Whether the New South Wales Government will carry to fruition its original scheme and whether its example will be followed in other States will depend first of all on its appreciation of all that Dr. Paterson and other advisers have had to say. Once the Government has determined to go ahead, success will depend on the attitude of the medical profession and of those controlling hospitals. As Dr. Paterson has frankly stated, sacrifices will be necessary. Many persons who treat cancer at present will need to be prepared to treat it no longer, but to hand over patients to the central body. They will do this if they realize that the welfare of the patient is the first consideration, far outweighing any other in importance. Hospital authorities who sometimes delight in numbers and in long lists of diseases appearing in reports will have to be prepared to exclude certain patients from certain beds. It may also be objected that the employment of medical staffs on a full-time basis is not desirable. Again the same argument applies—if such an arrangement is for the good of the patient, if suffering is to be lessened and more lives are to be saved by this means than by any other, then all dislike to full-time service must go by the board. It is to be hoped that there will be no delay and that governmental action so splendidly begun will be carried through to its conclusion. Australia should not lag behind other countries in cancer treatment.

Current Comment.

BRONCHOSPIROMETRY.

APART from those medical men who are specially interested in the more active therapeutic measures in pulmonary disease, it is doubtful if more than a few people in Australia have even heard of bronchospirometry. The employment of this procedure has been developed because of the necessity to determine the functional capacity of each lung before such an operation as thoracoplasty is decided upon. As the name implies, bronchospirometry is a means of measuring the flow of air in and out of a bronchus; that is, in and out of the lung to which that bronchus leads. It will be readily seen that the information revealed should be of great value to the surgeon contemplating a pulmonary operation. Briefly the procedure consists in passing a double-channelled catheter so that one limb terminates in the left main bronchus and the other in the trachea, closing the left bronchus and trachea by means of inflatable balloons forming part of the instrument, and connecting each limb of the instrument to a spirometer.

The practical application of bronchospirometry has been discussed recently by John D. Steele.[1] He points out that since the functional capacity of a lung cannot be ascertained with any degree of accuracy by radiological methods, the value of bronchospirometry has generally been conceded. However, it has not been so widely practised as it might have been, because most physicians and surgeons have the impression that the procedure can be carried out only when special research facilities are available. "This impression has been gained because most of the literature on the subject, while of indispensable scientific value, has been fully comprehensible only to a small group of physicians who have made a particular study of respiratory physiology." Steele points out that it is not necessarily a complicated procedure, and that in a simplified form it can be carried out in almost any hospital or sanatorium. The results obtained from the method employed by him are often of great clinical value. Bronchospirometry is of particular value when a patient with a low respiratory reserve seems to require some "irreversible collapse therapy", such as thoracoplasty. In such cases it is indispensable. In Steele's experience the procedure is of great value also in a certain group of cases in determining whether thoracoplasty would result in the collapse of functioning lung tissue.

In the early days of the practice of bronchospirometry, a double-channelled bronchoscope was used; now the metal instrument has given way to a pair of flexible rubber catheters. Once the instrument is in position, the consumption of oxygen, the elimination of carbon dioxide, the amount of tidal supplementary and complementary air, and the vital capacity, can all be determined. But in most places the facilities for these determinations are not available. However, as Steele points out, the oxygen consumption is the most important function, and this can be readily determined by attaching each limb of the instrument to an apparatus for recording the basal metabolic rate. A comparison is then made between the oxygen consumption of one lung with the oxygen consumption of the other lung. The patient's pharynx and larynx are anæsthetized as for bronchoscopy. The patient is then placed on a horizontal table; the larynx is exposed with a direct-vision laryngoscope, and the double-channelled catheter is passed into the trachea, its progress being watched fluoroscopically by an assistant. When the tip has reached a point in the left main bronchus, three inches below the carina, the balloons are inflated. As the catheters are flexible, the patient may be allowed to rest with his head on a pillow.

Steele mentions certain difficulties that the operator may encounter. In the first place it may be found impossible to expose the larynx; in such an event the catheter must be passed by indirect vision. The patient's respiratory reserve may be so low that the mere introduction of the catheter causes such dyspnœa as to necessitate termination of the procedure. In such a case bronchospirometry is scarcely necessary; for the patient is obviously unfit for thoracoplasty. Again, one or both of the channels may become blocked by secretions. In such a case it might be necessary to repeat the procedure on another day, after bronchoscopic aspiration. Because of the possibility of blockage of the channels, it is always advisable to perform a preliminary bronchoscopic examination. Finally, leakage of the apparatus may result in untrue findings.

Steele describes three cases to illustrate the value of bronchospirometry. In the first of these the patient was having treatment by artificial pneumothorax on the left side, the degree of collapse being about 50%. Disease of the right lung was advanced. The vital capacity was 1,000 cubic centimetres. Bronchospirometry revealed that the right lung was practically functionless. Thoracoplasty was therefore performed on the right side. If it had been found that the functional capacity of the right lung was equal to that of the left, thoracoplasty would not have been performed; for it would have caused too great a reduction in the vital capacity. In the second case, a woman having treatment by artificial pneumothorax to the left side had a vital capacity of 900 cubic centimetres. Thoracoplasty was contemplated for the treatment of disease of the right lung. As bronchospirometry revealed that the oxygen consumption of the right lung was almost equal to that of the left lung, the operation was not undertaken. The third patient was a woman, aged forty-nine years, whose vital capacity was 1,000 cubic centimetres. She had a large cavity in the apical portion of the left lung. Bronchospirometry revealed that the left lung was practically functionless. Drainage of the cavity was carried out by the Monaldi method, and later thoracoplasty was performed.

Much can be done for the sufferer from pulmonary tuberculosis. It is doubtful whether many medical men know the value of the various active measures of treatment even in these enlightened days. There is still a tendency to allow the often wilful tuberculous subjects to drift. One of our objects in drawing attention to Steele's article is to arouse the clinical conscience of those who have not yet developed an appreciation of the modern methods of therapy in tuberculosis.

[1] *The American Review of Tuberculosis*, June, 1943.

THE FOOD VALUE OF RED ANTS.

K. MITRA AND H. C. MITTRA have been engaged on a chemical analysis of Indian foodstuffs. Among these are red ants, which, under the name of *hau*, find a ready sale at a comparatively high price in some of the village markets in Bihar, India. They are often eaten raw, and they are regarded as a delicacy. Mitra and Mittra have found that *hau* has a protein content of 13·38 and a carbohydrate content of 9·12 grammes per 100 cubic centimetres. They have recently extended their observations on this interesting article of diet by feeding it to young rats with the object of determining its value in available protein.[1] Rats were given a diet that was almost nitrogen-free for a period, during which the nitrogen content of their urine and fæces was estimated. They were then given an ordinary diet for a week, at the end of which time they were given food containing *hau* in the proportion of 10% and 15%, respectively, as the only source of protein. The relative digestibility coefficient and the relative biological value were then calculated by the formulæ devised by Chick *et alii*. The relative digestibility coefficient proved to be about 65% and the relative biological value 55% to 58%. It would seem, therefore, that the protein of red ants has a food value. The whole investigation seems almost fantastic at first glance. But there are stranger foods than ants. For example, Melanesians eat head lice and sometimes bed bugs; the Australian aborigine eats ants and grubs. In these days of food rationing it is comforting to learn that when our meat supply becomes inadequate we may turn with some hope of survival to ants.

[1] *The Indian Journal of Medical Research*, May, 1943.

Abstracts from Medical Literature.

SURGERY.

Restoration of Blood Flow in Damaged Arteries.

A. H. BLAKEMORE, T. W. LORD AND P. L. STEFKO (*Annals of Surgery*, April, 1943) present the results of experimental investigations into methods of restoring blood flow through damaged arteries. In a prefatory discussion they refer to the unsatisfactory results of attempted vascular repair during the last war, and to the number of amputations necessitated by damage to blood supply. In the present war they consider that the problem of blood vessel anastomosis is deserving of important consideration for various reasons. The newer methods of the control of infection may be expected to result in vascular damage becoming a relatively still more important cause for amputation. Chemotherapy should at the same time improve the prospects of a successful outcome in operations undertaken for arterial repair. Further assistance is likely to be derived from the use of anticoagulants. Using a vitallium tube as a prosthesis, the authors tried various methods of bridging gaps in the femoral arteries of dogs, and made the point that this artery, at any rate in dogs, provides a more difficult test than do the carotid arteries or the aorta. A simple bridging tube of vitallium was unsuccessful, but methods in which one or two vitallium tubes are employed, and segments of vein are used to provide a continuous intimal lining, gave encouraging results. Ingenious methods were evolved to avoid the use of sutures, and to permit the connexions to be made by simple ligatures. Microscopic sections showed that a continuous intimal lining had been established. These results were achieved without the use of anticoagulants. A successful application of the method in a human patient is described. A further series of experiments was performed on dogs whose wounds were deliberately contaminated, and it was found that the tube method succeeded far more regularly than a method of arterial suture. By the implantation of sulphanilamide powder into alternate wounds, the prophylactic value of this substance against infection was demonstrated. Further work is being done to examine the use of heterogenous vein transplants. The authors outline a scheme for the organized treatment of patients with arterial injuries, and suggest the storage and use of segments of vein from other subjects and from cadavers.

Repair of the Anal Sphincter.

J. F. RUZIC, R. L. VOLLER, C. L. JANDA AND D. S. DI CIRO (*Surgery*, April, 1943) present a method for the relief of anal incontinence following injuries to the sphincter from fistula surgery, parturition *et cetera*. The basis of the method is the thorough stretching of the remnant of sphincter with the aim of temporarily paralysing it and securing rest during healing. The divided ends have been found to be covered by tendo-fascial caps. These are located by palpation, and are then brought into apposition and retained there by one or two stout catgut sutures inserted through the skin. This is done in order to restore the circular shape of the sphincter so that the muscle may be stretched by the very gradual dilatation of the anus. It has been found by careful slow stretching that a sphincter remnant, which at first measures two or three centimetres in length, can be stretched until it measures six to eight centimetres. Some twenty or thirty minutes are devoted to the slow dilatation of the anus, and then the stay sutures are removed and an incision is made to expose the ends of the damaged sphincter. The fascial connective tissue caps on the ends of the divided sphincter are dissected clear, but are not removed. They are then approximated by interrupted sutures of chromicized gut. If indicated, a routine perineorrhaphy is carried out. Two cases are reported in which the procedure gave good results.

Physiological Basis of Surgical Treatment of Asthma.

L. MISCALL AND E. A. ROVENSTINE (*Surgery*, April, 1943) discuss the detailed physiology of respiration with reference to the surgical treatment of asthma. In certain types of asthma the bronchial constriction is due to a reflex which has its origin in the lung. The afferent pathway of this reflex traverses the sympathetic nervous system and may be interrupted surgically as a therapeutic measure. The reflex afferent impulses of constriction travel predominantly by sympathetic pathways which may be interrupted at the second, third and fourth thoracic ganglia. Bronchial asthma precipitated by recurrent infection in the bronchi is considered to depend, probably, on excitation of this reflex constriction, and should be benefited by interrupting the reflex before irreversible damage occurs in the lungs. The pulmonary origin of the reflex may most readily be determined by blocking the pathway. Unless a pulmonary origin is thereby demonstrated no indication exists for surgical severance of the pathway. Surgery must be restricted to patients with asthma of pulmonary origin.

Physical Factors in Inflammation.

C. J. BELLIS (*Surgery*, May, 1943) has made a detailed inquiry into the factors governing the rate of spread through the animal of bacteria and their toxins. After reviewing the literature on the character of inflammatory exudate and on the spread of bacteria through the tissues, the author sets out the methods used in an experimental investigation conducted by himself. In an examination into the effect of inflammatory change on the diffusibility of a simple toxic substance, injections of strychnine solution were made into the hind paws of rats. Intact animals were used as controls, and with other rats, whose lower limbs had been injured by heat twenty-four hours previously to produce an inflammatory reaction, were injected with strychnine solution. The control animals all succumbed, while all but one of the burned animals survived and were not even convulsed. The animal which was the exception died, but the onset of convulsions was delayed. To determine the rate of absorption of tetanus toxin, injections of toxin were made into the tips of rats' tails, and the tails were then, at increasing intervals, amputated near the base with bone-cutting forceps. Amputation performed within ten to twenty minutes usually saved the animal, whereas a delay of more than twenty minutes was usually fatal. In a series of experiments undertaken to test the spread of bacteria through the tissues, 75 rabbits were used, the general procedure in each case being to make a subcutaneous injection of a bacterial suspension, and then to take samples of tissue fluid at definite distances from, and also at the point of injection, at four-hourly intervals thereafter (a fresh group of animals being used for each four-hourly observation). The author found, in the rabbit, that *Streptococcus viridans*, *Staphylococcus aureus*, pneumococcus Type I and *Bacillus coli* spread rapidly, while *Bacillus prodigiosus*, *Bacillus pyocyaneus*, and some strains of *Staphylococcus aureus* spread slowly. In the rat the most rapidly spreading organism was *Bacillus welchii*. Experiments with citrated blood plasma and with plasma clots confirmed the presence in both staphylococci and streptococci of a fibrinolysin and a coagulase. The author discusses the effects of these ferments in increasing or decreasing the spread of bacteria through the tissues.

Cancer of the Lung and Tobacco Smoking.

E. J. GRACE (*The American Journal of Surgery*, June, 1943) remarks on the increasing incidence of cancer in the respiratory tract, and suggests a possible causative factor in excessive tobacco smoking. In observing a large series of patients suffering from lung cancer, the author has noted that the patients were almost always men, and also that they were heavy cigarette smokers and almost always inhalers. Roffo, in Buenos Aires, was able to isolate from tobacco tar a highly carcinogenic substance, benzpyrene. This is not contained in the nicotine, but is a component of the products of combustion of tobacco. Experiments with this substance showed it to be highly carcinogenic, causing invasive, expanding and destructive proliferations. The author gives details of three cases of very active lung cancer with metastases, all occurring in heavy smokers who had inhaled over a period of at least fifteen years. The author belives that in a susceptible individual, the application of the carcinogenic substance in tobacco tar to the bronchial mucosa for a prolonged period may be a causative factor in carcinoma formation.

Nutrition and Hæmatopoiesis after Total Gastrectomy.

THE first reported successful case of total gastrectomy was performed by Schlatter in 1897. At present the operation is being performed with increasing frequency. J. M. Farris, H. K. Ransom and F. A. Coller (*Surgery*, June, 1943) therefore thought it necessary to observe the effects of this operation on the absorption of food from the intestinal canal and also on

the blood-forming functions of the body. Since 1937, twenty-nine complete gastrectomies have been performed at the University of Michigan Hospital. Of the twenty-nine patients, twenty-four survived the operation and have provided the material for the present study. Troublesome symptoms may arise early after operation if meals are not restricted in quantity, but the jejunum later enlarges and comes to resemble the stomach as a reservoir. Full meals at usual intervals can then be taken without any discomfort. It is found that digestion of protein is not interfered with at all, the pancreatic and small intestinal juices taking over this function completely. No errors in fat metabolism were discovered. Other writers have reported that after gastro-enterostomy and partial resection of the stomach, they found incomplete digestion of fats, but the authors suggest that these observations were made in the early post-operative period when there is likely to be some hypermotility of the intestine, leading to faulty absorption because of rapid passage of the food. Observations on patients in the present series performed at a later stage have failed to show any such interference with fat metabolism. There is a definite increase in the rate of absorption of glucose after total gastrectomy, and this leads to high blood sugar levels in the early stages after ingestion. In one case quoted this rose to 308 milligrammes *per centum* in the first hour. This rapid absorption appears to cause an increased secretion of insulin, as the rise is followed by a marked fall down to, in this case, 39 milligrammes *per centum* at three hours. At this stage the patient may be distinctly uncomfortable. There is usually a gradual rise to normal levels in the fourth and fifth hours. Diets rich in protein and poor in carbohydrate are effective in preventing these abnormal fluctuations. Clinical and experimental findings have not substantiated the theory that removal of part or whole of the stomach may be followed by pernicious anæmia. An anæmia may arise, but it is of the hypochromic microcytic type. The iron in the usual diet is in the ferric form, which is not absorbed until it is converted to the ferrous form by the action of hydrochloric acid, so that iron deficiency might readily arise after total gastrectomy. However, this may be prevented by administering ferrous iron by mouth in doses of five grains three times daily for one week in each month. Alternatively hydrochloric acid may be given with the diet. The authors found that there might be a temporary increase in motility of the intestines after this operation, but that this soon passed, and that eventually the rate of passage of a barium meal might be rather slower than normal. This is accounted for by the fact that the vagus nerves are almost invariably sacrificed in total gastrectomy.

Gastric Acidity after Partial Gastrectomy.

ONE of the objects of gastric resection as a method of treating peptic ulcer is to reduce the gastric acidity, and as it is realized that small resections often fail to do this, there has been a tendency to advise more and more extensive resections. C. W. Holman and B. McSwain (*Surgery*, June, 1943) have therefore made a study in an attempt to determine what is the optimum amount of stomach to be removed. They consider that the operation should conform to the following standards. Firstly, it should produce an adequate reduction in gastric acidity. Secondly it should be such that, if a recurrent ulcer develops, a secondary procedure will not be rendered too difficult and hazardous. Thirdly, the mortality should not be too high in the hands of the average surgeon. The present study is based on eighty-eight patients who had had various types of gastric resection for gastric and duodenal ulcer. They were examined clinically, and gastric analyses were performed over periods of from one to seven years. Great care was used in the gastric analyses to avoid fallacious results which might yield lower curves than were actually present. The cases were divided into three groups according to the amount of stomach removed. The first group comprised those patients in whom the pyloric antrum alone was resected. The second group comprised those who had a resection of between one-half and two-thirds of the stomach, the lesser curvature being divided proximal to the *incisura angularis*, but a fair amount of the greater curvature being left. The third group consisted of those in whom a high resection was performed, more than two-thirds of the stomach being sacrificed. Of the first group, it was found that only 25% had a low acidity or achlorhydria. In the second group, this object was attained in 80% of cases. In the third group 90% showed these findings. The clinical results bore little relation to the level of post-operative acidity. However, it is noted that all cases in which marginal ulcers have developed after operation, have been those in which the gastric acidity had not been adequately reduced. The authors come to the conclusion that the most practical resection in cases of peptic ulcer is one in which not too much stomach is sacrified, but in which between one-half and two-thirds of the organ is removed, a moderate amount of greater curvature being retained, but division being made fairly well up along the lesser curvature.

Melanoma.

W. E. HOWES AND M. BIRNKRANT (*The American Journal of Surgery*, May, 1943) define melanoma as a malignant tumour derived from pigment-producing cells. The microscopic picture is extremely varied and may simulate many other types of malignant tumour. The theories as to the origin of the melanotic cell are many, but one which is widely held at present is that it is derived from the cells within the sensory nerve end-organs. More than 50% of melanomata arise in nævi which have been present since birth or shortly afterwards. It has been shown that the average individual is born with fifteen to twenty pigmented moles. Melanomata are four times as common in white races as in black. The authors report thirty-two cases seen at the Brooklyn Cancer Institute over a period of about six years. The most common site was on the limbs, the lower more often than the upper. Next in frequency were the ocular melanomata. The earliest warnings of these latter growths were blurred vision or decreased visual acuity. Pain and proptosis were late manifestations. Melanomata rarely cause serious symptoms on account of the primary lesions. They spread by direct extension to surrounding tissues, by lymphatics to adjacent skin and regional lymph nodes, and by the blood stream to distant parts. The time interval between the onset of the local malignant change and the occurrence of deposits in lymph nodes is very variable, the average in the present series being 19·2 months. The earliest was in three months, and the most delayed was in a patient who had a melanoma removed from the eyelid and developed lymph node metastases six years later. Distant metastases occurred as early as eight months and as late as fifty-one months. An analysis of treatment and results shows the failure of single or multiple local excisions of the growth. Not a single one of the eleven patients treated by this method alone has survived. The best results are likely to follow radical local excision followed in one to two weeks by routine dissection of the regional lymph drainage area without waiting for clinical evidence of lymph node spread. These lesions usually prove resistant to irradiation therapy, and such treatment should be used only as a palliative.

Tanning Agents versus "Vaseline" Gauze.

J. W. HIRSHFELD, M. A. PILLING AND M. E. MAUN (*Surgery, Gynecology and Obstetrics*, May, 1943) have conducted a series of clinical experiments to compare the effects of tanning agents with those of "Vaseline" dressings on clean wounds in man. Criticism has been voiced from time to time of the tannic acid method of treating burns. One objection raised has been that tannic acid has a caustic effect on the unburned tissues and leads to further destruction of the part. Certain experimenters have examined the effects of the tanning of burns in animals, and histological preparations have been made. There is an obvious difficulty in obtaining histological preparations of such tissues in man, and in addition, the depth of destruction of tissues in accidental burns is always irregular and confuses the issue. The authors felt that it might be valuable to study the effects of tanning and "Vaseline" on wounds of an even depth such as are produced at the donor area in the cutting of skin grafts with a Padgett dermatome. This they did, and also managed to persuade the patients to allow biopsy material to be taken at intervals for histological examination. The results are reported with photomicrographs. The patients complained that the areas treated with tannic acid were more painful than those treated with "Vaseline". Without exception, the areas treated with "Vaseline" gauze healed more quickly than those treated by eschar-forming methods. Microscopic slides showed that in forming the eschar, the tannic acid destroyed the dermis to a great depth. In addition a marked leucocytic exudate was found beneath the eschar with further destruction of the collagenous bundles of the dermis. "Vaseline" proved to be non-irritating to the exposed dermis, and only a mild red blood cell and leucocytic exudate were found. The only visible damage to the dermis was in those cases showing some infection.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on November 18, 1943, at the Broughton Hall Psychiatric Clinic. The meeting took the form of a series of clinical demonstrations.

Hyperpiesis with Associated Conditions.

A number of patients suffering from hyperpiesis were shown. It was pointed out that in the course of routine physical examination of patients admitted to the clinic it was found that female patients whose ages came within the involutional epoch frequently had raised blood pressure. By graphing blood pressure against age in the case of male and female patients respectively, one saw in respect of female patients a steep ascent in the curve commencing in the fifth decade, whereas in respect of males the ascent was not observed for another ten or fifteen years. It seemed, therefore, that during the female involutional period some factor operated which conduced to hyperpiesis. The series of patients was shown to illustrate the frequency of hyperpiesis in female patients at the clinic; they represented about 12% of the female patients under treatment, whereas only about 3% of the male patients were hyperpietic. From the psychiatric point of view, no specific syndrome was associated with hyperpiesis. In many cases the condition was discovered only in the course of routine examination, and was not related causally to the patient's symptoms. Perhaps the most frequently seen and most directly produced psychiatric manifestations of hyperpiesis were anxiety states; these represented the patient's emotional reaction to such physical disturbances as precordial pain, palpitation or dizziness. Someone had said that patients suffered more from the knowledge that they had high blood pressure than from the condition itself. Hypertensive patients with anxiety states responded well to rest, mild sedation and psychotherapy.

Hyperpiesis with Paraphrenia.

The first patient shown was a female, aged thirty-seven years, who had been treated at the hospital on two previous occasions. Psychologically, she had on each admission presented a typical paraphrenic psychosis (auditory and visual hallucinations and ideas of reference and persecution), and had responded favourably to "Phrenazol" treatment. The interesting feature of the case, however, was the record of a progressively higher blood pressure with each admission; in 1939 the pressure was 140 millimetres of mercury (systolic) and 90 (diastolic); in 1941 it was 155 millimetres of mercury (systolic) and 95 (diastolic); and at her latest admission to hospital it was 160 millimetres of mercury (systolic) and 100 (diastolic). The patient was at the beginning of a hyperpietic career. The psychosis was only accidentally related to the hyperpiesis.

The next patient shown was a female, aged fifty-nine years, who had been admitted to the clinic on July 30, 1943. She was said to have had a mental breakdown seven years earlier, and had never been well since. For a long time she had had delusions that people invaded her house at night, talked about her and "scandalized" her. She had abandoned her ordinary interests, and merely sat about; she said: "Why should I work?" It had been observed that her memory was defective for recent events.

On her admission to the clinic, she had auditory hallucinations (that people talked about her) and delusions of persecution (that people entered her house at night and spread scandalous stories about her). It was noticed that her memory was not so inaccurate as appeared, and that she probably was deliberately evasive rather than forgetful about incidents. She exhibited great reduction of psychomotor activities, and was quite contented to be doing nothing. She was not depressed. She was thin, debilitated and pale, and had arthritic deformities and crepitus in the left shoulder. Her systolic blood pressure was 196 millimetres of mercury and her diastolic pressure 106. She was kept in bed for two months, and she accepted that inactivity placidly and showed no spontaneity. She was evasive about her paranoid ideas. She never complained of any cephalic or other discomfort. On October 25 her systolic blood pressure was 240 millimetres of mercury and her diastolic pressure 110.

It was pointed out that this patient in the late involutional period had a high blood pressure without symptoms other than those of a paraphrenic psychosis, which was probably not directly related to the blood pressure. It was to be noted that the physical habitus of the patient was the antithesis of the usual plethoric type that was commonly associated with hyperpiesis.

Hypertension.

The third patient shown was a female, aged forty-three years, who had had eleven children in fourteen years. She had been admitted to hospital on September 15, 1943. The patient was the sixth of a family of twelve children; all her siblings were healthy except a brother, who had kidney trouble. Towards the end of 1942 she had suffered from bad headaches and had been irritable. In January, 1943, she had a heart attack and was in hospital for six weeks. She had another attack, and was readmitted to hospital for a further three weeks. She said that she had been having "turns"; she had a terrible, dull feeling, and then she became unconscious and knew nothing for an hour or more. Some months earlier she lost power in her left side for two days. Her present complaints were of severe depression, irritability, pains in her head, a ringing sound like bells in her ears, insomnia and attacks of giddiness. She suffered severely from palpitation. Her friends said that she was absent-minded, forgetful and irritable.

On her admission to hospital, her mental state was exactly as described. She looked anxious, worried and miserable. Her systolic blood pressure was 210 millimetres of mercury and her diastolic pressure 125; her pulse rate was 72 per minute. The blood vessels were not palpable. There was no evidence of renal insufficiency, and neurological examination gave negative results. Soon after her admission to hospital she had an attack of severe headache, which lasted for several days; subsequently her condition improved, and she had been free from discomfort. Her systolic blood pressure fell to 190 millimetres of mercury and her diastolic pressure to 100. Treatment consisted in mild sedation with sodium phenobarbitone and opium, and complete rest.

The comment was made that this patient illustrated a number of points in relation to hyperpiesis: (i) the onset during the early involutional period; (ii) the characteristic but non-specific subjective symptoms—headache, depression, irritability; and (iii) the rapid subjective improvement that followed the institution of a therapeutic regimen of mild sedation and rest.

Hyperpiesis Associated with Hypochondriasis.

The fourth patient shown was a female, aged fifty years, who had been an inmate of the clinic for five months at the age of thirty-four years. That illness had begun after her father's death from apoplexy; she had "turns", in which she trembled and fell down, complained of severe head pains and grew light-headed and giddy. She was emotionally unstable and irritable. Her systolic blood pressure was 125 millimetres of mercury and her diastolic pressure 70. The diagnosis was anxiety neurosis. During the sixteen years following her discharge she had enjoyed bad health, and had been a frequent inmate of the local hospital. At home she had been "cranky", a chronic "nagger".

On her readmission to the clinic, her mental state was one of complete preoccupation with somatic and visceral sensations of discomfort, bad headaches, trembling stomach, retching, shivering and so on. She was depressed and had no interests apart from her own discomforts. Physical examination gave negative results except for hyperpiesis; her systolic blood pressure was 200 millimetres of mercury and her diastolic pressure 120. It was pointed out that the patient had had twenty years or more of neurotic ill health, commencing with an anxiety neurosis and evolving gradually into a confirmed state of hypochondriasis. The hyperpiesis could not be correlated with the nervous manifestations and was to be regarded as an independent entity.

Hyperpiesis with Simple Depressive Psychosis.

The fifth patient was a female, aged fifty-four years, who had had two previous depressive illnesses; the first had begun thirty years earlier following her first confinement, and the second, which had lasted about three years, had begun eight years prior to the meeting. The present attack had begun two years before the meeting, quite suddenly; the patient found she could take no interest in anything, could not sleep, had an unpleasant, empty feeling in the head and became very depressed. The depression had been continuous; she had become a burden to her daughter, who had to force her to eat and take exercise. On one occasion she made a suicidal attempt.

On her admission to the clinic, the patient was acutely depressed; she felt hopeless, had very little interest or

energy, and had to force herself to do the slightest tasks. She had no hallucinatory or delusional symptoms. Her systolic blood pressure was 190 millimetres of mercury and her diastolic pressure was 115. There was no evidence of cardiac or renal inadequacy.

The mental state of the patient was a typical depressive psychosis (simple melancholia), and it was considered to be independent of the hyperpiesis. In view of the uniformly good results achieved in depressive states with shock therapy, it was decided, in spite of the hyperpiesis, to give her a course of electro-shock therapy. Up to November 1, 1943, she had had ten convulsive seizures, with the result that all depressive symptoms had vanished. Her systolic blood pressure on that date was 210 millimetres of mercury and her diastolic pressure 120, and she complained of frequency of micturition.

Hyperpiesis Associated with Diabetes and Early Cardiac Insufficiency.

The sixth patient was a female, aged fifty-eight years, who had been admitted to the clinic on September 20, 1943. She had a family history of diabetes, her father, brother and sister having succumbed with this disease; another sister had died of Bright's disease. The patient had been recognized as diabetic some years earlier, but insulin therapy was not instituted until four months prior to the meeting. A balance was achieved with twenty units of protamine zinc insulin in the mornings. For some months she had been depressed, had surrendered her usual interests in the home and her amusements, and had been irritable and emotionally unstable. On her admission to the clinic her systolic blood pressure was 170 millimetres of mercury and her diastolic pressure 115; a month later the figures were respectively 180 and 120. The cardiac rhythm was irregular.

The comment was made that the patient's depressive symptoms seemed to have appeared concurrently with the establishment of a diabetic regimen. She complained of no symptoms referable to the hyperpiesis, but there was evidence of commencing cardiac insufficiency. She had entered the clinic with a view to having "shock" treatment for her depression, but a decision had been deferred on account of the physical factors.

Hyperpiesis with Congestive Heart Failure.

A further female patient, aged fifty-nine years, was shown. She had been admitted to the clinic on September 2, 1943, with a history of mental depression, emotional instability and loss of interests. On examination, she was found to have all the signs of serious congestive heart failure, and it was subsequently found that she had suffered from "bronchitis" for some months. She had generalized anasarca, she was dyspnœic and cyanosed, there were signs of hypostatic congestion at the bases of both lungs, the sputum was blood-stained, her voice was hoarse and she vomited frequently. Her heart was dilated; her systolic blood pressure was 135 millimetres of mercury and her diastolic pressure was 110. The urine contained a faint cloud of albumin.

The signs and symptoms of cardiac failure persisted for some weeks, her principal complaint being of nausea and anorexia, and she vomited frequently. By the beginning of November all the œdema had disappeared and the dyspnœa was much less, her appetite had improved and she no longer vomited. Her systolic blood pressure was then 180 millimetres of mercury and her diastolic pressure was 110.

It was pointed out that the patient was shown partly to illustrate one of the cardiac complications of hyperpiesis, but principally to demonstrate how sometimes nervous symptoms were over-valued. Admittedly the patient was depressed; but she had serious family worries quite sufficient to account for an acute depressive reaction. Actually, she required treatment for a grave physical condition.

Hyperpiesis with Confusional Psychosis.

Another female patient, aged sixty-three years, had been admitted to hospital on September 7, 1943, with the history that five weeks previously she had begun to act queerly. She said that people followed her about and walked on the roof of her house or entered her room through secret panels in the walls. One day her bed felt hot; she thought it was on fire, and called the fire brigade to extinguish it. She thought her husband was trying to "gas" her with coloured fumes. It was stated that four years earlier she had had an illness during which she had difficulty in writing—she knew what she wanted to write, but could not produce it.

On her admission to the clinic she had auditory, visual and olfactory hallucinations and delusions of persecution by her husband and other people. She was disorientated for time and place. She had vivid coloured visual hallucinations—for example, of persons dressed in green, yellow and red on a brightly illuminated stage. Her systolic blood pressure was 190 millimetres of mercury and her diastolic pressure was 110. Crepitations were audible at the bases of both lungs, and she was obviously ill. Her mental state was one of acute confusion, and it was regarded as being secondary to congestive cardiac failure occurring as a complication of hyperpiesis. It was pointed out that not infrequently in hyperpiesis, when cardiac insufficiency occurred it was signalized by the appearance of symptoms of mental confusion, attributable probably to falling blood pressure and inadequate cerebral circulation. The patient had an irregular pyrexia for two or three weeks, and then her condition rapidly improved. On November 1 her systolic blood pressure was 280 millimetres of mercury and her diastolic pressure was 140; she had some precordial discomfort and complained of a fluttering feeling around her heart.

Hyperpiesis with Depressive Psychosis.

Another female patient, aged sixty-four years, had been treated at the clinic from May 1, 1933, to September 4, 1933, for a recurrent depressive psychosis; her systolic blood pressure at that time was 165 millimetres of mercury and her diastolic pressure was 110. Since her discharge she had had frequent short episodes of depression. On her readmission to the clinic in August, 1943, she was depressed, irritable and hypochondriacal. Her systolic blood pressure was 200 millimetres of mercury and her diastolic pressure 100, and her arteries were palpable. There were no subjective symptoms directly referable to the hyperpiesis nor objective signs of cardiac or renal insufficiency. On April 1, 1943, her systolic blood pressure was 280 millimetres of mercury and her diastolic pressure was 150. She said that she felt quite well, and in fact had made no complaints for some weeks except of some lumbar discomfort. In this case it was thought probable that the mental symptoms were only accidentally associated with the hyperpiesis. It was striking how free from symptoms the patient was, in spite of her high blood pressure. It was interesting also to note that ten years earlier, when she was aged fifty-four years, hyperpiesis was already present, and that during the intervening time the blood pressure had apparently risen steadily.

Hyperpiesis with Depressive Psychosis and Migraine.

The final patient in the series was a female, aged sixty-six years, who had been admitted to the clinic on September 22, 1943, with a history of depression of two months' duration following an attack of migraine, to which she had been subject since adolescence. This was the worst attack she had ever had. She had had several previous depressive illnesses, the first when she was aged twenty-nine years, after a confinement, the second when she was aged thirty-eight years, and the third when she was fifty-one years—this had lasted for several years. On her admission to the clinic, she was retarded, depressed and uninterested. Her systolic blood pressure was 180 millimetres of mercury and her systolic pressure was 110, and arteries were thickened.

There appeared to be no causal relationship between the patient's hyperpiesis and her depressive psychosis; her mental symptoms were heralded by an attack of migraine, but in view of her history of previous attacks they were to be regarded as the manifestation of the depressive cycle of manic-depressive psychosis.

Subacute Combined Sclerosis.

Two patients suffering from subacute combined sclerosis were shown. The first was a female, who had first been admitted to the clinic at the age of forty-three years in 1931. She had been in another hospital in 1928 suffering from a confusional psychosis which was diagnosed as encephalitis. At that time her blood picture was in no way suggestive of pernicious anæmia. On her admission to Broughton Hall in 1931, the erythrocytes numbered 1,387,500 per cubic millimetre and her colour index was 2·0. She had achlorhydria, and was unable to walk on account of paraplegia; extensive sensory changes were present in all extremities. The diagnosis of pernicious anæmia and subacute combined sclerosis was obvious. Within a month her blood picture had returned to normal and in three months' time she was able to walk. She was discharged from the clinic after five months, when her gait was still unsteady and feeble and she still retained numerous paræsthesiæ; but her blood picture was normal. Treatment had consisted in the administration of raw liver and brain

together with dilute hydrochloric acid, and she was advised to continue this regimen. She was readmitted to the clinic in December, 1936, having been well until a short time previously. She complained of tinnitus and of sensations of "pins and needles" in her hands and feet. She walked quite well, and her blood picture was normal. Her systolic blood pressure was 200 millimetres of mercury and her diastolic pressure 120, and this fact no doubt accounted for the tinnitus. She was discharged from the clinic after four months, and was again readmitted in 1939, complaining of dyspnœa, tinnitus and headaches. Her blood picture was normal; she retained paræsthesiæ of the hands and feet, but she was able to walk quite well. Her systolic blood pressure was 145 millimetres of mercury and her diastolic pressure was 90. She was given a series of "Campolon" injections, and was discharged from the clinic after two months. Since her last discharge she had attended as an out-patient; she was taking dilute hydrochloric acid and raw liver and brain. She was able to move about actively; occasionally her feet grew numb, but her hands felt perfectly normal.

The patient was presented to show that with persistent treatment the prognosis in subacute combined sclerosis was not so hopeless as had formerly been thought. When she first began treatment she was paraplegic and incapable of walking. There was little doubt that the improvement in and maintenance of function had been due to the administration of liver and brain substance.

The second patient suffering from subacute combined sclerosis was a male, aged fifty-nine years, who had first come under notice in 1938, when he was referred for treatment of neurasthenia. He had worked as a tram driver, and in 1933 was involved in a collision; since then he had been afraid to drive, as he always expected an accident. He had palpitation, his limbs trembled and he suffered from diarrhœa. In the course of the past five years he had frequently been incapacitated. On his admission to the clinic he complained of headaches, of trembling, of shooting pains in the thighs, and of a tingling sensation all over the body. Physical examination revealed no objective abnormalities except increased tendon responses.

He was readmitted to the clinic in 1940; he had not been well since his previous discharge; he became easily fatigued and trembled. He complained of "pins and needles" and of occasional loss of feeling in the hands and legs. He staggered sometimes as if he were drunk. He walked slowly, but there was no obvious abnormality of gait nor obvious weakness in the legs. His tendon reflexes were increased and the plantar responses indefinite. He remained in hospital for four months.

He was readmitted to the clinic again in June, 1941. He suffered from increased difficulty in walking, and had to use two sticks and frequently fell; he was unsteady, especially in the dark. Neurological examination disclosed diminished perception of light touch in the fingers and hands and feet; movements of the upper and lower extremities were clumsy. Rombergism was pronounced, he walked with difficulty and his gait was ataxic and spastic. The knee jerks were very active, bilateral patellar and ankle clonus was present and both plantar responses were extensor in type. A fractional test meal examination disclosed achlorhydria. Blood examination revealed that the erythrocytes numbered 4,125,000 per cubic millimetre and the colour index was 1·1; anisocytosis was present. A diagnosis of subacute combined sclerosis was made.

The case was held to be instructive, inasmuch as the diagnosis was not made much earlier. On the patient's first admission to hospital the only neurological abnormality noticed was hyperactivity of the knee jerks, and even when he was examined on the second occasion his disability was mostly subjective. On his third admission to the clinic, however, the condition had advanced to an obvious spastic ataxic paraplegia, the ætiology of which was indicated by the achlorhydria. It was interesting to note that the patient had never shown any obvious sign of pernicious anæmia.

Sydenham's Chorea.

A series of patients suffering from Sydenham's chorea were shown. The first was a male, aged seventeen years, who had been admitted to the clinic on September 28, 1943. He was mentally deficient (his intelligence quotient was 78) and he had a history of delinquency in the form of petty thieving. About a week before his admission to the clinic it was noticed that he was clumsy in his movements and that his limbs twitched.

On his admission, gross choreiform movements of the right arm and leg were obvious; these subsided when his attention was deeply engaged. He grimaced continually, and his speech was slurred and indistinct. No evidence was found suggesting the presence of a rheumatic factor. After his admission to the clinic the choreiform movements became more continuous and of greater intensity and involved also the left side of the body. His speech became unintelligible, and he complained of great weakness. Treatment by continued narcosis with "Somnifaine" was instituted, together with the administration of ten units of insulin per day. He began to show improvement after a couple of weeks.

It was pointed out that Sydenham's chorea was an affection of childhood and early adolescence; it preferred girls to boys. The case under discussion was, therefore, rather out of the common with respect to sex and age. The outstanding manifestation of the syndrome was the presence of choreiform movements; but in addition muscular weakness and incoordination were also present. The last-mentioned condition was usually manifested in disordered speech—some patients, in fact, became anarthric. The disease was self-limited with a tendency to recurrence; no specific treatment was known, but sedation was usually necessary to protect the patient from bruising himself.

Another patient was a female, aged fifteen years. Her present illness had begun sixteen months earlier, when she complained of sore throat and lassitude and became awkward in her movements. Her speech was thick, and she screwed up her face and eyes. She was ill for three months, then returned to school, and remained well until a few weeks prior to the meeting, when she complained that her knees and wrists were sore and swollen. The irregular, clumsy movements were again observed, and they soon became so wild that she had to be spoon-fed. For the preceding week or so she had talked ceaselessly and incoherently and had been unable to carry on a conversation. She had had visual hallucinations, seeing a phantom which she told to go away. She had lost weight.

On her admission to the clinic, her mental state was one of acute confusion; she was disorientated for time and place, could not carry on a conversation, and was faulty in her habits, noisy and resistive to attentions. Nevertheless, she had lucid moments during which she was accessible. She exhibited active choreiform movements affecting all her musculature. She rolled and twisted her body and threw her limbs about; her facial muscles were in a state of continual grimacing activity. A systolic bruit was audible over all her precordium.

It was pointed out that this case presented a typical background of Sydenham's chorea; the patient was an adolescent female who had rheumatic arthritis and carditis and had had a previous attack. Her grandfather had suffered from chorea, and the clinic records showed that familial recurrence of Sydenham's chorea was quite common. Treatment by sedation with "Somnifaine" was instituted, and ten units of insulin were given each day to stimulate the appetite and increase the intake of food.

Sydenham's Chorea: Post-Choreic Paranoid Psychosis.

Another patient was a female, aged sixteen years, who had been admitted to the clinic on November 4, 1943. She had undergone appendicectomy four years earlier, and a few weeks after the operation she was admitted to hospital suffering from rheumatic fever. She was discharged from hospital after two months, but developed chorea a few weeks after returning home, and was readmitted to hospital, where she remained for nine weeks. Seven weeks prior to the meeting she complained of weakness in her left arm, her speech became affected and she had difficulty in pronouncing words; she was readmitted to hospital and the diagnosis of rheumatic chorea was made. While she was in hospital she caused considerable disturbance in the ward, and it was thought there was an hysterical element in her case; for this reason she was sent to Broughton Hall. When she was admitted to the clinic she said that people at the other hospital used to call her "Tonkey". Her mother reported that the patient had thought that people were opening her letters, saying she was mad, laughing at her and making fun of her. She said she had a baby, and told her mother that there were wires around her bed and that people at the office could listen in. She exhibited no choreic movements. A systolic bruit was audible in the mitral and pulmonary areas. After her admission to the clinic the patient showed no signs of chorea, but exhibited the hand extension sign of Wilson. Mentally she was abstracted, reserved and reticent. She gave the appearance of being hallucinated for hearing by stopping her ears with her fingers.

It was pointed out that the onset of chorea in the early "teens", recurrence and association with endocarditis were typical of Sydenham's chorea. There was some doubt as

to the significance of the patient's mental symptoms, which had a strong schizoid colouring—they might represent the onset of schizophrenia; on the other hand, they might be the aftermath of a confusional state which might reasonably be supposed to have accompanied the early stage of her relapse. The psychiatric prognosis was therefore in doubt.

(To be continued.)

Correspondence.

EXTRACTION OF CATARACT IN ITS CAPSULE (TOTAL EXTRACTION).

SIR: The letters which appeared in the journal subsequent and referring to my article on the "Extraction of Cataract in its Capsule (Total Extraction)" were rather disappointing in that the majority of the correspondents were concerned more with results than in comparing the intrinsic merits of the methods of total (intracapsular) extraction as against that of the partial (extracapsular) operation.

In order to assess the value of the two procedures from a scientific point of view it is necessary: (*a*) that the two types of operation be performed under similar, if not identical, circumstances, and if possible by the same surgeon or at the same clinic; and (*b*) that the material submitted for operation be of a similar or identical nature.

Should a surgeon obtain better results by employing a particular method of operation, it does not necessarily follow that the procedure adopted was the better one, nor that his skill was greater. The result must be conditioned *inter alia* by the state of the eye previous to operation.

So far as my own experience is concerned, and being acquainted with both methods, I am satisfied that the new method of total extraction is far superior to the older one, and I am convinced that not only would I not have been able to obtain the same result by the "classical" method, but also that many of the cases in which I have successfully operated by total extraction would have had to be rejected if the older procedure were to be employed. In point of fact, several of the patients in my series have been previously rejected as unfit for operation.

With regard to the question of vitreous prolapse, I should like to repeat what I said in my original article: "The percentage of vitreous accidents in a series of cases cannot be taken at its face value, unless the state of the vitreous previous to the operation is also taken into consideration." I pointed out then that eight out of the ten patients had degenerative changes in the vitreous previous to operation, which made its escape practically inevitable, seeing that in such circumstances the vitreous was almost fluid. The correspondents, in discussing my figures, elected to ignore this fact while stressing this complication.

I should like to draw Dr. J. A. O'Brien's attention that I had ten patients with vitreous prolapse out of the forty submitted for operation, and that this would amount to 25% and not 40% as stated by him in his letter (THE MEDICAL JOURNAL OF AUSTRALIA, December 4, 1943). Dr. Kevin O'Day, referring to my figures in his letter (THE MEDICAL JOURNAL OF AUSTRALIA, November 13, 1943), said: "Eighteen of his forty patients, that is, 45%, regained a visual acuity of $^{6}/_{12}$ or less." What I actually said was "The patients who have $^{6}/_{9}$ vision and better therefore amount to 22, and those with $^{6}/_{12}$ vision and better to 28 of the 40 submitted to operation." Converted into percentages, therefore, 70% of my patients acquired a visual acuity of $^{6}/_{12}$ and better, and it was not correct therefore for him to say that "45% regained a visual acuity of $^{6}/_{12}$ or less" (!).

The relative value of the two types of cataract operation has been a popular subject for discussion in the ophthalmological societies for the past decade. "Sinclair of Edinburgh in 1932 stated that after following up cases over a period of years, he had no doubt as to the superiority of total or intracapsular extraction especially in immature cataracts."

Gilbert Sourdille of Nantes (France), after having practised the older "classical" extraction, declared after eight years' experience with the newer (intracapsular) operation:[1] "For my part, the striking, clear and illuminating conclusion derived from more than thirty years' practice with the extracapsular extraction and from almost eight years' experience with the method of total extraction is that the latter possesses incomparable advantages over the former, advantages proclaimed especially by the patients operated by the one and the other method", meaning that such patients that have been submitted to one and the other type of operation in each eye have found that the method of total extraction gave much the better result. De Saint Martin states, for instance, that such patients are emphatic that although they acquired $^{6}/_{6}$ vision in each eye, the one operated by total extraction obtained better vision from the point of view of quality as distinct from that of quantity as measured by the chart.

And finally we have the opinion of Fisher of Chicago, who says: "In the United States, Vail, Knapp, Peters, Verhoeff, A. S. and L. D. Green, Millette, Meding, Fisher, Pratt, Hallett, and others have reported visual results after the intracapsular method. In their hands the results are superior to those obtained by the capsulotomy method and the complications very much less. From these reports I am led to believe that the intracapsular method offers a great many advantages, but few disadvantages, provided the operator is competent and prepared to handle the complications successfully."

Referring back to Dr. Kevin O'Day's somewhat ironical letter and to his innuendo that "under certain circumstances the pocket of the surgeon might become a little heavier" *et cetera*, I should like to say that there is no need to descend from the discussion of an academical subject to the vulgar consideration of a monetary proposition.

With reference to his statement that "the English school of ophthalmic surgery is well known for its conservatism, and it is not at all surprising that oculists in this remote outpost of Empire should still cling tenaciously to methods long since discarded by their more astute continental colleagues", I could do no better than to quote Sir William Osler,[1] the father of the modern English school of medicine: "A serene satisfaction with the *status quo* and a fatuous objection to change have often retarded the progress of medicine. In every generation, in every country, there have been, and ever will be, *laudatores temporis acti*, in the bad sense of that phrase, not a few of them men in high places, who have lent the weight of a complacent conservatism to bolster up an ineffectual attempt to stay the progress of new ideas. Every innovator from Harvey to Lister has been made to feel its force."

Yours, etc.,

R. A. DE CASTRO BASTO, M.D., B.S., M.R.C.S., D.O.M.S.

B.M.A. House,
135, Macquarie Street,
Sydney.
December 15, 1943.

[1] G. Sourdille: *Bulletins et mémoires de la Société française d'ophtalmologie*, 1938, page 471.

MENTAL HYGIENE.

SIR: Psychiatrists and others will note with approval the proposals regarding mental hygiene adopted at the recent conference at Canberra.

Provision of psychiatric observation wards and annexes at all the larger general hospitals will be a forward step and one to be commended not least on humanitarian grounds, for the temporary housing of lunatics in police cells is hardly in keeping with modern developments. A general survey of mental deficiency and insanity and of desirable extensions of mental hospital accommodation can be made by reference to the annual reports of mental hospital departments in the various States. A survey of the number of mentally defective persons in the community would be of interest, but judging by experience elsewhere might very well fail to lead to any practical result.

No doubt in due course statistics regarding the numbers of subnormals rejected at recruitment or discharged later from the military forces will arouse interest.

A Royal Commission in England in 1906 and a joint committee of the Board of Education and the Board of (Lunacy) Control in 1929 produced lengthy reports and detailed statistics and recommended more institutions for mental defectives, which the responsible authorities have for the most part failed to put into practice.

For long enough attention has been focused on the end products in deficiency and insanity. Were more efforts made to ascertain the dull and backward and the unstable in childhood and appropriate educational and other remedial measures applied during the formative years, the problem of the adult misfit would, I believe, in some measure be reduced.

[1] William Osler: From an address entitled "British Medicine in Greater Britain" given before the British Medical Association, Montreal, 1897.

Psychiatry shares with general medicine a deep concern about housing, nutrition and employment. In a more special field the future of mental hygiene lies with better ascertainment and appropriate remedial facilities in schools, day nurseries, playgrounds, juvenile courts and in homes and agencies controlled by child welfare departments. I trust that the proposed survey will be wide enough to include these outposts of the mental hygiene territory.

Yours, etc.,

W. S. DAWSON.

Sydney,
December 20, 1943.

THE NERVOUS SOLDIER.

SIR: May I join in the nervous soldier controversy by offering my congratulations to Professor Bostock and Dr. Evan Jones for their courageous and realistic presentation of the facts relating to the nervous soldier.

Most medical men who have had experience of repatriation tribunals will be in agreement with their views. Misunderstanding appears to have arisen over the term "malingering". There is the calculating cold-blooded malingerer, but there is also the unconscious malingerer who rationalizes in response to the instinct of self-preservation. In normal behaviour such unconscious exaggeration or malingering is the natural psychological reaction to fear of insecurity or intolerable circumstances. Are we not all "potential exaggerators"? May I suggest that the critics search in their own lives for examples of self-deception and exaggeration? If they are unable to find any such evidence, then they are indeed supernormal.

However unpalatable it may be for us to confess our weakness, we must admit the need to understand and control this escape mechanism if we are to acquire that self-discipline which is so essential if our civilization is to endure.

Yours, etc.,

"REPATRIATION TRIBUNAL REFEREE".

December 22, 1943.

Corrigendum.

IN the issue of December 4, 1943, a letter from Dr. J. Bruce Hamilton was published on page 471. Several errors need correction. In the first column the inverted commas after the word "escape" in the sixth line from the bottom should be transferred to appear after the word "possibility" two lines lower down. In the second column the word "not" before "require" in the second line should be transferred to appear before the word "require" in the third line. In Table I the last of the "visual results" should be "less than $^6/_{\infty}$".

Naval, Military and Air Force.

CASUALTIES.

ACCORDING to the casualty list received on December 24, 1943, Major R. H. Stevens, A.A.M.C., of Kew, Victoria, who was previously reported missing, believed prisoner of war, is now reported to be a prisoner of war.

According to the casualty list received on January 4, 1944, Lieutenant-Colonel A. E. Coates, A.A.M.C., Toorak, who was previously reported missing, is now reported to be a prisoner of war.

Nominations and Elections.

THE undermentioned has applied for election as a member of the Western Australian Branch of the British Medical Association:

Stanton, Roy Alan Julian, M.B., B.S., 1938 (Univ. Melbourne), 44, St. George's Terrace, Perth.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Smith, Arthur Kitchener, M.B., B.S., 1941 (Univ. Sydney), 29, Park Road, Marrickville.

Frost, Walter Rex, M.B., B.S., 1939 (Univ. Sydney), 16, Birriga Road, Bellevue Hill.

Obituary.

GEORGE CRANSTON ANDERSON.

WE regret to announce the death of Dr. George Cranston Anderson, Secretary of the British Medical Association, news of which has been received by cable from London.

Books Received.

"The 1943 Year Book of Radiology"; Section on Diagnosis edited by Charles A. Waters, M.D., and Whitmer B. Firor, M.D.; Section on Therapeutics edited by Ira I. Kaplan, B.Sc., M.D.; 1943. Chicago: The Year Book Publishers, Incorporated. 9" × 6", pp. 456, with many illustrations. Price: $5.00.

Diary for the Month.

JAN. 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JAN. 14.—Queensland Branch, B.M.A.: Council Meeting.
JAN. 28.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

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